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Railway Ballast Number

THE Government has authorized the railways to spend nearly $500,000,000 for additions and betterments. Of this probably from $50,000,000 to $100,000,000 will be spent for track ballasting.

This makes ballast production an Essential Industry, for in the distribution of coal and for other necessary supplies the Railways come first.

In this issue of ROCK PRODUCTS will be found:

"Railway Ballast Business Coming"
An editorial summary of the ballast business of the past three years and the prospects for 1918.

"Railway Ballast Experiences—Summary Showing Preferences"
A tabulation of the experience and practice of various railway companies.

"Stone Ballast Specifications of the Pennsylvania Lines"
Probably the most severe requirements of any railway organization.

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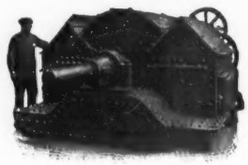

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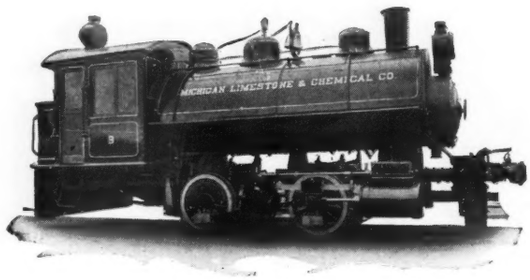

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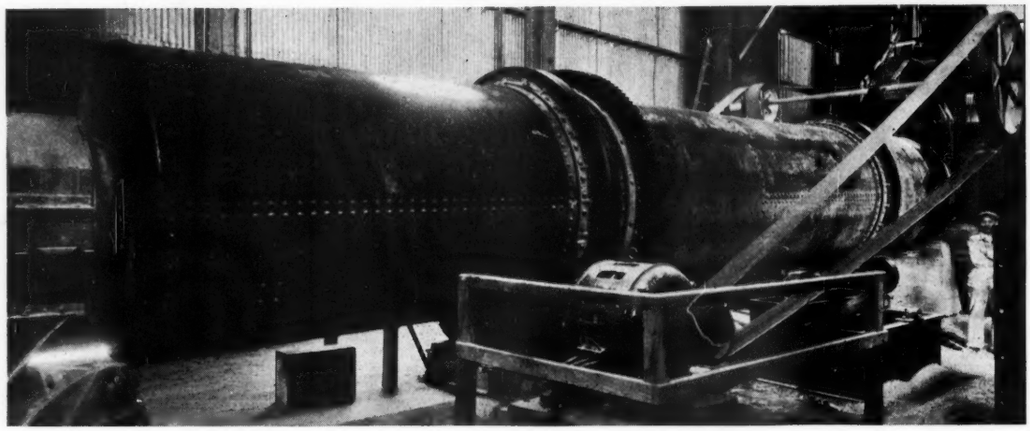

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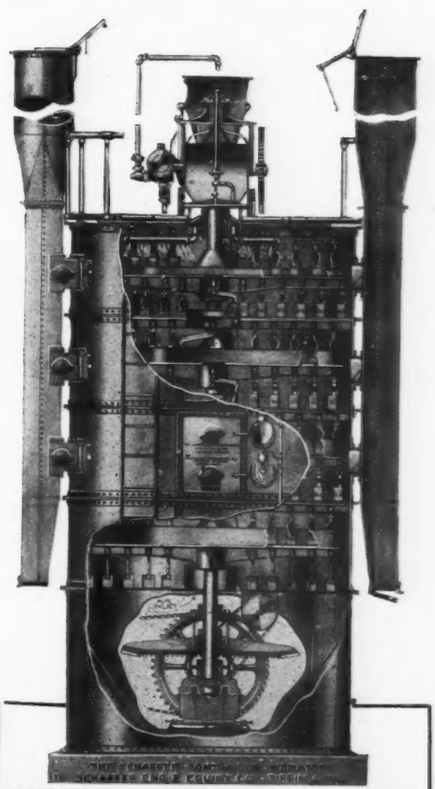

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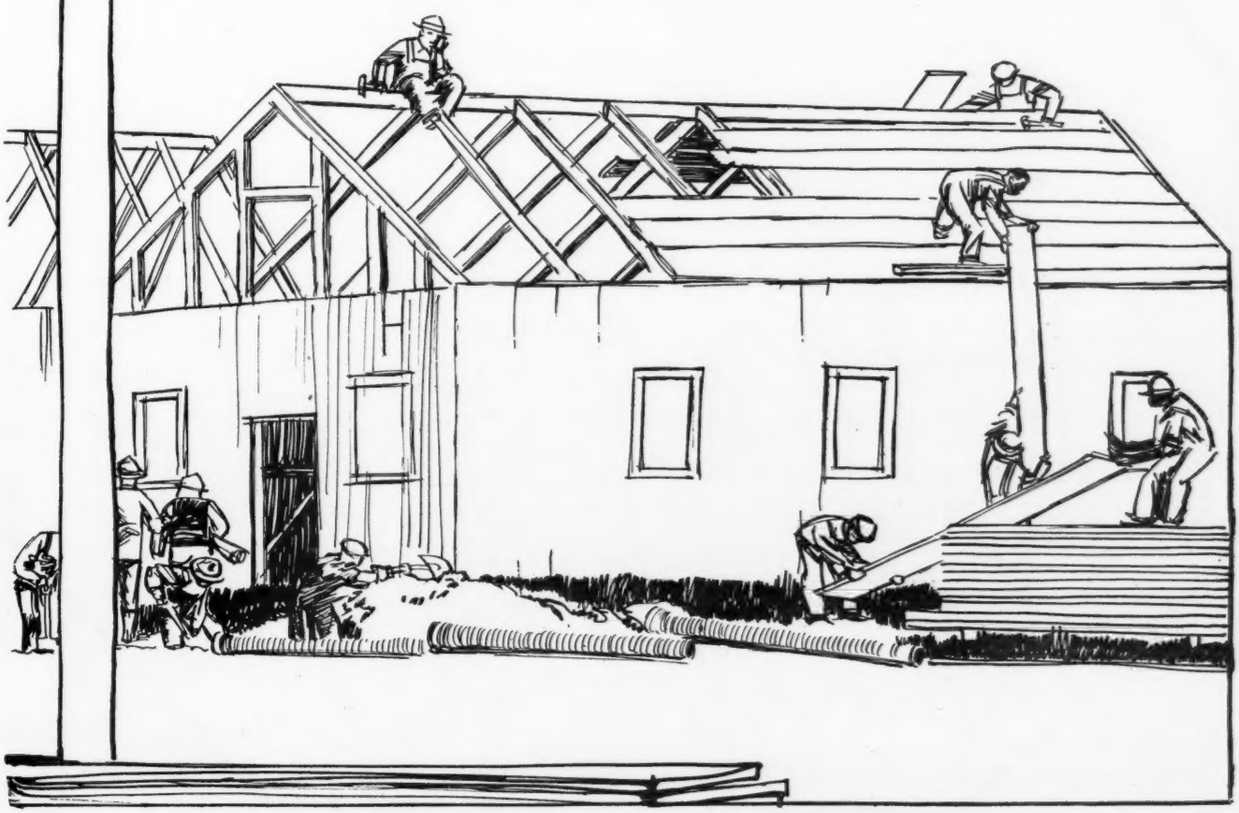

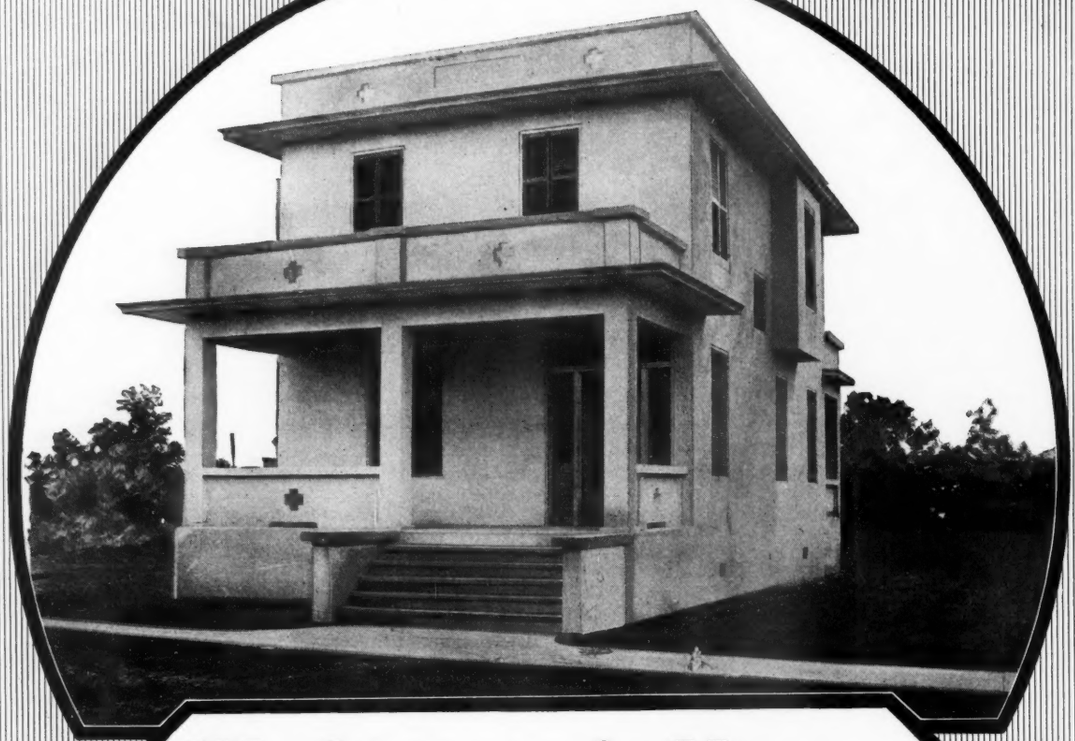

Workingmen's Homes

The current issue of ALPHA AIDS, a publication issued regularly by us in the interests of engineers, architects, contractors, builders and building-material dealers, is devoted entirely to the big subject of proper housing for American workmen.

Although we are building just one type of house at our own plants, we have not confined attention to that in this issue but have printed all the information available on several types of permanent homes of modern character and reasonable cost. Sixteen pages, with special supplement, giving news of actual building operations, photographic views, floor plans and useful working details. Free to all engineers, architects, contractors, builders and manufacturers interested in this subject. One copy of this issue has been sent to every cement dealer in our sales territory, but we will gladly send extra copies if you can use them. One dealer has just written us for twenty extra copies.

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(228)

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That's the day we tell Uncle Sam just how hard we want to win this war. That's the day our government has officially set for us to purchase War Savings Stamps.

On June 28th every man, woman and child in the United States will be called upon to pledge his or her full quota of War Savings Stamp purchases for 1918.

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Remember this. You take no chances when you go the limit on War Savings Stamps. They are the best and safest investment in the world. They pay you 4% interest compounded quarterly. They **can't** go below par. You can get back every dollar you put into War Savings Stamps **any time you need it.** You can turn them in at the Post Office **any time** for their full value plus interest.

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AMERICAN Ring Pulverizers

are earning enormous profits for their users. The plant here shown paid five times its cost in profits in five months running. This is not an isolated instance. Many others have done equally well or better in producing

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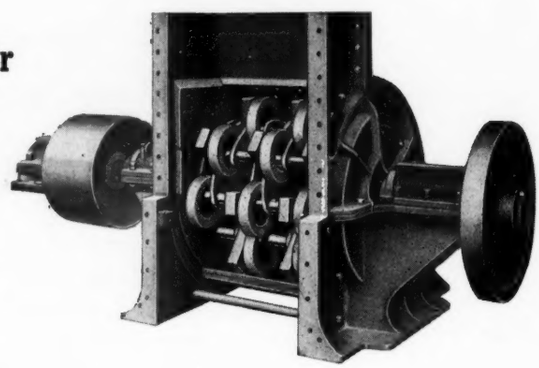

The profits are large; the market far bigger than the supply. Install a guaranteed machine—An American Ring Pulverizer. It's guaranteed. Cost of production is but 15 to 30 cents per ton when an American is used.

Furthermore we guarantee our estimates of power consumption, production, wear and tear, upkeep, etc., before making the installation. You take no chances.

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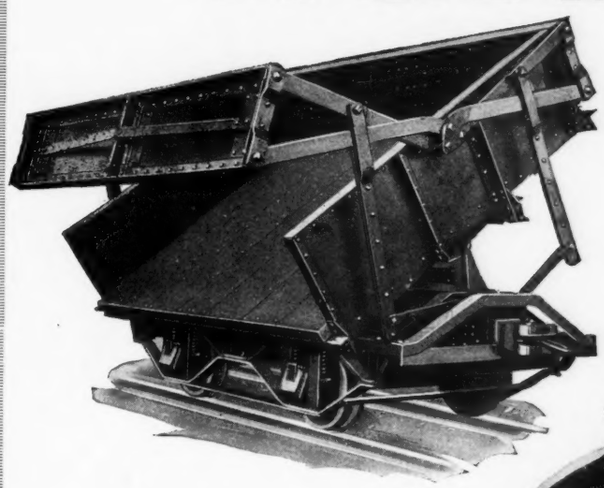

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The life-times of highly-trained specialists have been expended upon the creation of Watt Cars as they stand today. Surely it is an art to design cars which give such uniform and genuine success.

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An Inquiry Involves No Obligation

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ATLAS service stands pre-eminent. And behind this super-service stands the ATLAS organization of experts bending every energy to make *your* blasting more efficient and more economical.

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There is a proper ATLAS explosive for each individual blasting requirement. Our tests guarantee every pound for quality and uniformity. You can depend on ATLAS always to give absolutely uniform results under similar conditions.

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Put your blasting problems up to us

Our Service Department is a clearing house of blasting experience in all its phases and under all conditions. It is directed by experts who will personally help you apply this vast store of information to *your own blasting.* WRITE TODAY.

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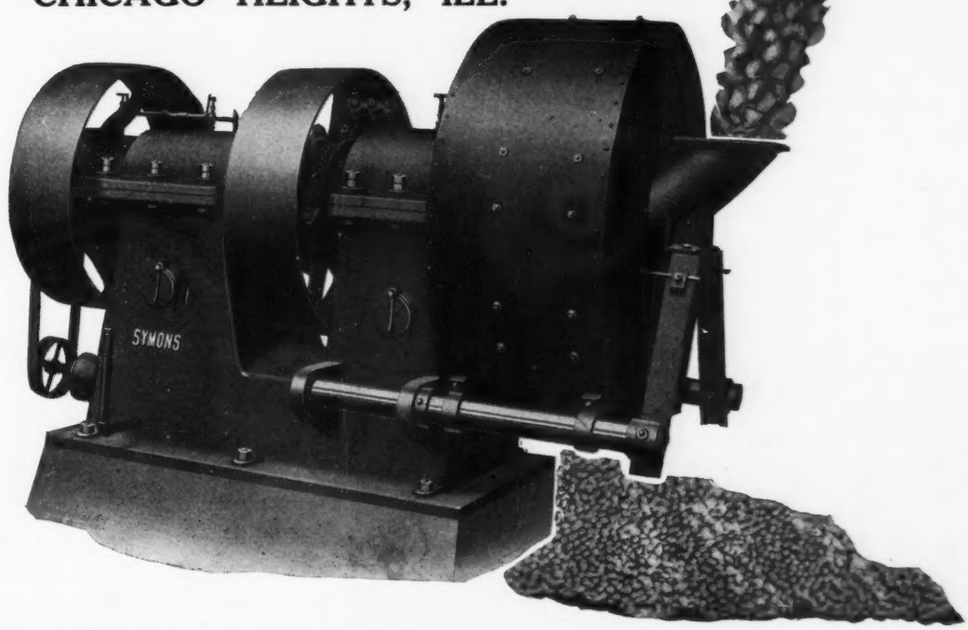

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Reduces to 80% through 200 mesh in one operation

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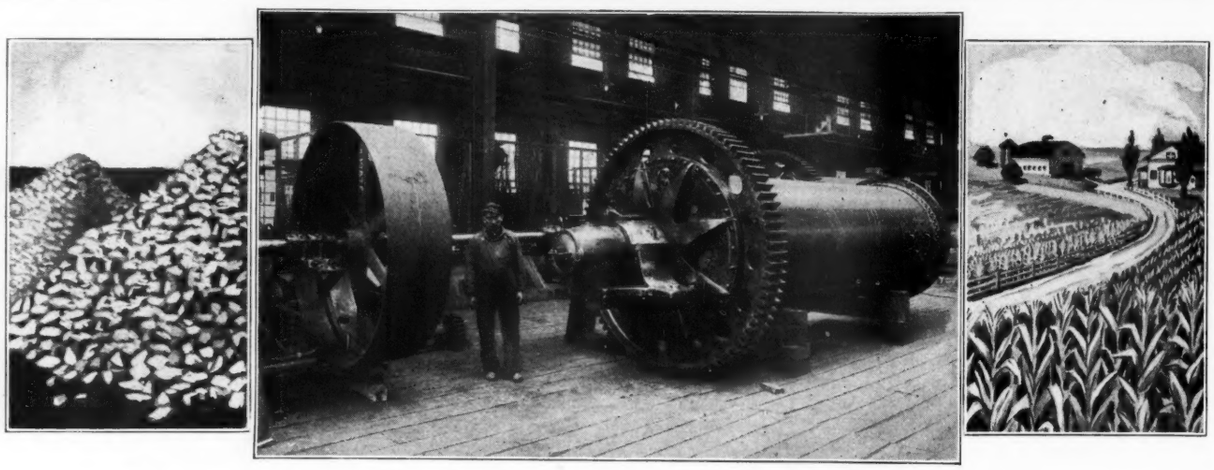

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Ask these organizations what their results have been. The Compeb Mill delivers a perfect product. We need make no claims; Our patrons produce the proof.

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Let the Compeb Mill be the connecting link between your limestone and splendid crops.

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You will get entire satisfaction if you mention ROCK PRODUCTS.

Rock Products

Vol. XXI Chicago, June 5, 1918 No. 3

Railway Ballast Business Coming

Large Quantities of Ballast Will Soon Be Required for Government's Billion Dollar Railway Budget

THE BALLAST business of the crushed-stone industry during the last three years has represented about one-fourth the total output and one-sixth the total value of the products. Road material has been the dominating product for the past three or four years, although commercial stone has been a close second. This year conditions will undoubtedly be reversed and ballast production will constitute two-thirds of the output.

PROSPECTS of a more than normal year's business in the production of railway ballast gives heart to crushed stone, gravel and slag producers. Never was more welcome news. Of the $1,000,000,000 which the Railway Administration has allowed for upkeep of track and equipment about half will go for additions and betterments. Assuming that 10 to 20 per cent of this $500,000,000 will go into ballast, which is said to be a conservative estimate, the business of crushed stone, gravel and slag producers will be helped to the extent of from $50,000,000 to $100,000,000 in 1918. Of course, included in this figure are some expenditures already made and contracts already in force.

AT FIRST GLANCE this sum appears large. It is claimed to be three times as much as spent in any one of the last three years. But the last three years have been notoriously lean years as regards railway maintenance and improvement. Moreover, the prices of labor and construction materials are such that the money will not go more than half as far as the same amount would have gone three years ago.

IT IS HARDLY likely that the railways can now buy crushed stone ballast for less than $1 a ton. The price of gravel ballast may range as low as 75 cents per ton. Under present conditions producers can hardly afford to take chances on lower prices than these, and unless an outlet is found for the smaller sized products there will be little or no profit in ballast at these prices.

THE RAILWAYS themselves have largely gone out of the ballast-producing business and it is hardly likely, in view of their many unsuccessful and unsatisfactory ventures, that the Government will encourage a return to this practice. Moreover, it is the whole spirit of the Railway Administration to concentrate on transportation and not bother with side lines which other business organizations can perform more cheaply and more efficiently. Therefore the railways are, or soon will be, in the market for something like 50,000,000 tons of ballast.

THE AVERAGE yearly consumption of ballast during the three years has been about 10,000,000 tons of crushed stone and probably about an equal amount of gravel, although the specific figures for gravel ballast were not collected by the United States Geological Survey, which furnishes the crushed stone estimate. Probably at least 5,000,000 tons of other ballast, slag, burned clay, chats, etc., was used. Hence the expected ballast business this year is about twice that of any of the previous three years.

UNDOUBTEDLY this business will prove a life-saver to many plants. The recently announced increase in freight rates, in many cases of short hauls amounting to 100 or even 150 per cent, will surely add greatly to the cost of commercial stone or gravel, and add another to the numerous obstacles in the way of extensive road improvement work. Nevertheless some way must be found to get rid of the smaller sizes of material.

WHY NOT TRY the method of a big Eastern crushed stone producer, who compelled the railway company to take the whole run of the crusher and to dispose of what it didn't want if it could, or if it preferred, give the stone company cars to dispose of the commercial sizes if this could be done? Think this over. United action on such a scheme by the national and state associations would mean something.

WHAT ARE your associations for? Get together and help Uncle Sam on his ballast proposition. Don't cut one another's throats in doing it, because (do you realize it?) 50,000,000 tons of ballast is only a small fraction of the 2,000,000,000 tons which the railways will need during the life of your plant. The Government feels the need of your coöperation and your business, and it will be poor policy not to work together as never before to make official Washington realize that yours is a real business—one employing nearly 150,000 men and representing an investment of close to a quarter of a billion dollars.

Railway Ballast Experience

THE ACCOMPANYING tables give a summary of the experience and preferences of some of the country's main railway systems as to track ballast. These tables are taken from the committee report of the American Railway Engineering Association, which met in Chicago a few weeks ago, as reported in ROCK PRODUCTS of March 27.

These tables are given to indicate the kinds of ballast the listed railways are probably in the market for as well as to make producers of railway ballast familiar with the requirements of the various companies. The following paragraph is from the "Manual" of the American Railway Engineering Association:

"While there is much variation in the qualities of the different natural materials for ballast, the decision must be as to what is the most available or expedient, and should be according to circumstances. In the case of crushed stone, however, the process of manufacture being under control, it is practicable to make the product conform to specifications. In the choice of ballast, where possible, gravel should be considered, as it has given excellent results when properly crushed, screened and washed."

Specifications for Ballast

Specifications for stone ballast on the Pennsylvania Lines West of Pittsburgh are given elsewhere in this issue. These specifications properly give the most severe requirements asked by any railway. Specifications for gravel ballast recommended by the American Railway Engineering Association are as follows:

"For Class A railways: Bank gravel which contains more than 2 per cent dust or 40 per cent sand should be washed or screened. Washed or screened gravel should contain not less than 25 per cent nor more than 35 per cent sand. For Class B railways: Bank gravel which contains more than 3 per cent dust or 60 per cent sand should be screened or washed. Washed or screened gravel should not contain less than 25 per cent nor more than 50 per cent sand. For Class C railways: Any material which makes better

Railway		Stone	Pit Gravel	Washed Gravel
C. B. & Q. Ry.	Kind and Size	Very little used	Clean river gravel used. 15% sand. Top loam stripped off. Gravel mostly used for ballast.	
A. T. & S. F. Railway	Kind and Size	1. Trap. 2. Flint. 3. Hard limestone. Sizes up to 2½".	Recommend stone maximum size 2½" with 30% sand.	
	Results	Best results with top dressing of 1" stone.		
Northern Pacific Ry.	Kind and Size	Limit stone to 2½" throwing out larger stone. Loam and clay limited to 5% to 10%. Varies from coarse sand to 50% stone over 2".		
N. & W. R. R.	Kind and Size	Limestone used and tests made with sandstone or granite. Size ¾" to 2½".	Size of stone not over 2½", while 25% to 35% sand is screened out.	Used in Ohio. Size 2½" to ¾", also size ¾" to ⅜" with no sand.
	Results	Sandstone and granite found too unsatisfactory for use.		Very poor ballast under heavy traffic. Usable with a little sand for light traffic.
Atlantic Coast Line	Kind and Size	Small mileage of crushed granite, and crushed Florida limestone. Size to pass 3" screen and hold on ½" screen.	Unwashed Va. gravel with a small amount of loam and clay used, also a gravel from Alabama free from loam and with 80% stone and 20% sand.	Have used washed gravel of 2 parts stone and 1 part sand. Trying gravel with 3 parts stone. Maximum size stone 1½".
	Results	The above has given satisfaction.	The first not as satisfactory as washed gravel. The second so satisfactory that it is hauled 500 miles.	
L. & N. R. R.	Kind and Size	Limestone only used, the sandstone being too soft. Size to pass 2½" ring with dust screened out.	On one division check gravel with 10% sand and stone from egg size down used.	
	Results	Should place coarse stone on subgrade and surface with 2" stone.	Very good ballast.	
Southern Pacific	Kind and Size	Crushed granite and basalt used. Size crusher run from ½" to 2½". Crushed disintegrated granite size of pea also used.	Clean stream gravel used with ⅓ sand and ⅔ stone. Stone ¼" to 2". A little gravel with 50% sand and 10% silt and 40% stone used.	
	Results	terials give good re- For first both masults. Second packs and drains well.	First used very generally. Second unsatisfactory and drains badly.	
B. & O. R. R.	Kind and Size	Trap rock, granite, limestone used. Size to pass 3" screen and hold on 1" screen.	Not more than 2% dust nor 40% of sand. Stone not specified as to size.	Not less than 25% nor more than 35% sand left after washing.
	Results	NO RECOMMENDATIONS.		

Railway		Stone	Pit Gravel	Washed Gravel
Pennsylvania R. R.	Kind and Size	Some gneiss and fine grained sandstone, but mostly trap used. (Limestone discarded as unsatisfactory.) Size to pass 3" and hold on 1¼" ring.	Loam and sand 10%, stone 90% used. Specified must be free from earth and loam and pass 2½" ring.	Sand excluded and stone ¼" to 2½".
	Results		Used on branch lines. Not very satisfactory.	Used on some branch lines.
Pennsylvania Lines—S. W. System	Kind and Size	Limestone only used. Size to pass 2½" and hold on 1" ring.	Small quantity only used, soil is stripped as clean as practicable.	Two kinds used. 1. Less than 5% sand. 2. With 20% sand. Maximum size stone 2".
	Results	Uniformity of size is very important.	Not desirable if washed gravel is obtainable.	Gravel with lesser quantity of sand is better.
Pennsylvania Lines—N. W. System	Kind and Size	Ohio limestone used. Size to pass 2½" and hold on 1" ring.	Used on some divisions. Maximum size stone 2". Maximum loam and sand 25% to 30%.	Very small amounts have been used for top dressing. Generally uniform in size.
	Results	Argillaceous dolomite from Dunkirk, Ohio, is the best.	Fairly satisfactory as ballast.	Good dressing but does not bind and hold track well for ballast.
N. Y., N. H. & H. R. R.	Kind and Size	Conn. trap rock used. Size to uass 2⅝" screen and hold on 1¼".	Gravel from 17 pits described, varying from 1% to 5% of loam and 10% to 75% of sand. Maximum size of stone 2½".	Not used.
	Results	Stone should be graduated uniformly. These dimensions are very satisfactory with heavy traffic.	Best gravel used had no loam and less than 40% sand. The latter stood up well under heavy traffic and drained well.	
Erie R. R.	Kind and Size	Trap rock and limestone used. Sizes 1" to 2½".	Gravel with no loam and about 40% sand used.	Not used.
	Results	Drains better when smaller screenings are excluded.	Not desirable for high speed track.	
C. R. I. & P. Railway	Kind and Size	1. Blue limestone. 2. Blue trap. 3. Porphyry, very brittle and light color. Use 3" or 4" stone for subgrade with top 6" of 1" stone.	Has about 15% to 25% equal parts of sand and clay. Stone up to 2" size.	If used should have 20% sand with larger stone 1½" size.
	Results	Above sizes hold track and give good drainage.	Sheds water and holds track well when properly drained.	
Missouri Pacific Ry.	Kind and Size	1. Limestone. 2. Sandstone. 3. Flint. 4. Granite. Size ½" to 2".	1. River gravel. 2. Hill gravel. 3. Hill cementing gravel. 35% sand, not more than 3% loam. Maximum size stone 1½".	1. Washed river gravel 45% sand and fine gravel. Maximum stone 1½". 2. Washed hill gravel. Maximum 35% sand and 10% gravel under ½". Stone maximum size 1½".
	Results	GIVEN IN ORDER OF EFFECTIVENESS.		

Summary Showing Preferences

track than the natural roadbed may be economically used."

Test for Gravel Ballast

The "Manual" of the American Railway Engineering Association gives the following method of testing the quality of gravel for ballast:

"(1) The size of the sample to be tested should be approximately 1 cu. ft.

(2) Five average samples of about 1 cu. ft. should be selected from various parts of the pit which is to be tested. The five samples should then be thoroughly mixed and about 1 cu. ft. of the mixture selected for testing.

"(3) To separate the gravel from the sand and dust use a 10-mesh screen, made of No. 24-gage wire. To separate the sand from the dust use a 50-mesh screen of No. 31-gage wire.

"(4) Measure the percentage of gravel, sand and dust taken from the sample by volume, giving the percentage of each ingredient compared to the volume of the sum of the ingredients as follows:

$$\text{Per cent of sand} = \frac{S}{G+S+D}$$

Where S = Volume of sand
G = Volume of gravel
D = Volume of dust."

Ballast Production a Real Business

Every year has seen a tendency to regard ballast as a specially prepared product and to eliminate many of the inferior materials hitherto used. This is a tendency to be welcomed by bona fide crushed stone and gravel producers because it means that the production of ballast is coming to be looked upon, even by railway men, as a specialty requiring some degree of skill and experience. These railway men themselves have been the worst violators of ballast specifications in the products of their own quarries and pits.

If such specifications as those of the Pennsylvania Lines are lived up to it means that none but an experienced commercial operator can produce ballast economically, and the idea that a railway track organization can open a pit or quarry and compete with an established operator will be laid to rest.

Specifications for Crushed Stone Ballast

Pennsylvania Lines West of Pittsburgh

The recent report of the Ballast Committee of the American Railway Engineering Association contained the following specifications for stone ballast of the Pennsylvania Lines west of Pittsburgh. These are said to be the only specifications which require a physical test of the stone.

INSPECTION

Access to Works

1. Inspectors representing the Purchaser shall have free entry to the works of the manufacturers at all times while the contract is being executed, and shall have all reasonable facilities afforded them by the manufacturer to satisfy them that the ballast is being furnished in accordance with the terms of these specifications.

Place for Tests

2. Such tests as are deemed necessary shall be made at a Testing Laboratory selected by the purchaser, but visual inspection shall be made at the place of manufacture prior to shipment as often as considered necessary.

Defect Found After Delivery

3. As it is impracticable to inspect all the ballast loaded in cars, carloads of defective material arriving at the site for unloading, and not previously inspected, shall be rejected and returned to the manufacturer, who must pay the freight charges both ways.

MATERIAL

Kind

4. The kind of material which shall be used for making stone ballast shall be "trap rock" and "limestone."

PHYSICAL REQUIREMENTS

Physical Qualities

5. Tests shall be made to determine: (a) Weight, (b) Water Absorption, (c) Percentage of Wear, (d) French Coefficient of Wear, (e) Hardness, (f) Toughness, (g) Cementing Value, (h) Crushing Strength.

Method of Testing

6. The physical qualities shall be determined by the standard "Methods for the Determination of the Physical Properties of Road-building Rock" (Bulletin No. 347) of the United States Department of Agriculture, Office of Public Roads and Rural Engineering, with the addition of compression test adopted for stone ballast tests by the American Railway Engineering Association.

Pieces for Testing

7. The description of the pieces required for a single test is as follows:

(a) For "Weight," a fragment of the rock weighing approximately 10 grams (0.35 oz.) and representing as nearly as possible an average of the entire sample.

(b) For "Water Absorption," the same test pieces as in (a).

(c) For "Percentage of Wear," 5 kg. (11 lbs.) of freshly broken fragments of stone 6.35 mm. (¼ in.) and 12.7 mm. (½ in.) in size, numbering about 50 pieces, but not exceeding 60, nor being fewer than 40 pieces.

(d) For "French Coefficient of Wear," no extra sample.

(e) For "Hardness," a piece of solid rock from which a cylindrical core, perpendicular to the bedding plane of the rock, 25 mm. (0.98 in.) in diameter and about 10 cm. (3.94 in.) long can be cut with a diamond core drill and faced off.

(f) For "Toughness," a piece of solid rock from which a cylindrical core perpendicular to the bedding plane of the rock, 25 mm.x25 mm. (0.98 in. x 0.98 in.) can be cut with a diamond core drill, and the ends ground plane.

(g) For "Cementing Value," ½ kg. (1.1 lbs.) of stone which can be crushed to pea size.

(h) For "Crushing Strength," a piece of rock from which a cylinder 50.8 mm. x 50.8 mm. (2 in. x 2 in.) can be cut by means of a diamond core drill, and accurately faced off on each end.

Temperature of Test Pieces

8. The temperature of the test pieces shall be between 5 and 40 degrees Centigrade (41 and 104 degree F.).

Physical Values

9. Other things being equal, the maximum or minimum results, as indicated, will govern in selecting stone for ballast, the figure named being the limit:

	Trap	Limestone
(a) A minimum "Weight per Cubic Foot" in pounds	180	160
(b) A maximum "Absorption of Water per Cubic Foot" in 96 hours, in pounds	0.35	2.20
(c) A maximum "*Percentage of Wear" of	2.00	5.00
(d) A minimum "French Coefficient of Wear" (40 divided by Per Cent of Wear) of	20	8
(e) A minimum "†Coefficient of Hardness" of	18	14
(f) A minimum "‡Toughness" of	21	7
(g) A maximum "°Cementing Value" of	10	75
(h) A minimum "Crushing Strength in Pounds per Square Inch" of	25,000	10,000

Acceptance Requirements

10. (a) Tests may be made from time to

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* The test pieces in Clause 7-(c), after thorough drying, are placed in Deval cast iron abrasion cylinders, 20 cm. (7⅞ inches) in diameter, which are revolved at the rate of 30 revolutions per minute for 10,000 revolutions for each test, after which the stones are thoroughly washed, dried and weighed, and the percentage of dust or detritus by weight that will pass through a screen with a 1.6 mm. (1/16 inch) mesh is considered the percentage of wear.

† The test piece in Clause 7-(e) is subjected to the grinding action of crushed quartz sand, not more than 5 per cent of which will be retained on a No. 30 sieve and not more than 25 per cent of which will pass a No. 40 sieve, fed upon a revolving steel disk against which the test piece is held perpendicularly with a pressure of 1,250 grams (2.8 pounds). When the disk has made 1,000 revolutions, at the rate of 30 per minute, the loss in weight of the sample is determined and the test repeated with the specimen reversed, and an average of the loss in weight taken. The Coefficient of Hardness is expressed by $H = 20 - \frac{1}{3} w$, in which w represents the loss in weight of the specimen stated in grams per 1,000 revolutions.

‡ The test piece in Clause 7-(f), after drying, is held on an anvil in the Page impact machine, like a miniature pile driver, under a plunger with sphere-shaped striking surface of 1 cm. (0.39 inch) radius, which is struck by a hammer, when released, weighing 2 kg. (4.4 pounds). The test begins with a 1 cm. (0.39 inch) fall of the hammer for the first blow, and continues with an increased fall of 1 cm. for each succeeding blow until the test piece fails, the number of blows and the height being the same and representing the toughness of the rock.

° The test pieces in Clause 7-(g), with 18 per cent of water, are given 5,000 revolutions, at the rate of 30 per minute, in a ball mill which contains two steel shot weighing 9.07 kg. (20 pounds) each, and the resulting dough is then made into 6 cylindrical briquettes 25 mm. (0.98 inch) in diameter and 25 mm. in height, and formed under a pressure of 132 kg. per square cm. (1,877.5 pounds per square inch), after which they are allowed to dry 20 hours in air, 4 hours in a hot-air bath at 100° C. (212° F.) and then cooled for 20 minutes in a desiccator, and immediately tested.

The low end of a ½ kg. (1.1 pounds) flat end plunger is pressed, by means of two spiral springs, upon the briquette standing on the anvil, after which it is struck by a 1 kg. (2.2 pounds) hammer 60 blows per minute, operated by a cam whose rise is such as to give an effective drop of 1 cm. (0.39 inch) to the hammer, and each blow recorded on a drum which makes a complete revolution in 100 revolutions of the cam.

The number of blows necessary to destroy the resilience of the briquette, so that no reaction is recorded on the drum, is the measure of the cementing value of the rock, the average of five determinations being taken.

time at the option of the purchaser, and especially when new strata are being opened up for crushing into ballast.

(b) Each stratum of a quarry shall be tested separately and not averaged with any other stratum.

(c) For obtaining the values for physical tests in Section 9, the average results on the numbers of specimens stated in the following table shall be taken:

Kind of Tests and Number of Tests: Weight, 5; Absorption, 5; Percentage of Wear, 2; Hardness, 5; Toughness, 10; Cementing Value, 10; Crushing Strength, 5.

(d) If the rock from a quarry or from any single stratum in a quarry should not meet all the requirements in one or more kinds of tests, the purchaser may accept the product if he considers that the quality values of the other kinds of tests are predominant.

(e) It is expected that only such ballast as will fulfill all the terms of the specifications will be shipped, unless a written order of exception shall have been given by the purchaser.

DETAILS OF MANUFACTURE

Size

11. (a) Stone ballast must be crushed or broken, as far as possible, into uniform cubes that will pass in any position through a 2½-in. ring, and will not pass through a 1-in. ring.

(b) If the screen is of such shape that slabs longer than 2¾ in. drop through the meshes, the manufacturer must have them broken by hand at the place of loading.

Cleaning

12. The ballast shall be free from dirt, dust or rubbish. When the rock is of such a nature that it does not become clean without preliminary scrubbing, a scrubbing machine shall be provided at the quarry.

Unit of Quantity

13. Stone ballast will be ordered and paid for by the net ton, in carload lots.

Building Interests Meeting Postponed to June 14

THE CONFERENCE of professions, trades and industries identified with the building business called by the American Institute of Architects for June 7 in New York for the purpose of considering present and future conditions in the building industry of the United States has been postponed until one week later, and will be held on June 14 at 10 a. m., in the Engineering Societies Building, Assembly Room No. 2, 25 W. 39th St., New York.

The postponement is caused by a confusion of dates on the part of the managers of the Engineering building, and in appreciation of the coöperation already shown by the managers of the building, the institute has agreed to waive its claims and to accept the later date, June 14.

The coöperation and attendance of all lines interested—material manufacturers, distributors, contractors, labor, engineers and architects—is welcomed and expected.

Making Gravel Association Useful

Ohio Producers Begin Program of Action

EVERY DAY emphasizes more and more the thorny path ahead of the producers of building materials. Every day sees the greater and greater need of coöperation and mutual assistance. If not organized in strong local and national associations with which to meet problems and difficulties collectively, individual producers face greater tasks than their individual efforts are likely to overcome.

Guy C. Baker

QUESTIONNAIRE
OHIO SAND & GRAVEL PRODUCERS' ASSOCIATION

1—Is your concern a corporation, partnership or composed of individuals?
2—If individuals, give the name and address of owner, or owners.
3—If partnership, give names and addresses of partners.
4—If incorporated, give date of incorporation, amount of capital stock, names and addresses of officers.
5—Approximate the tonnage of commercial ballast products which you expect to produce and ship during 1918.
6—What number of men do you employ?
7—Give estimate of total plant and real estate investment, $———.
8—Give approximate capacity of plant.
9—Attach hereto list of supplies, or machinery parts of which you have immediate use.
10—Attach hereto list of supplies, or machinery parts on hand which you have no need for, and which you would be willing to sell.
11—Give examples, concrete, of freight injustices in connection with your business, or in your vicinity, comparing freight rates on sand and gravel shipments with freight rates on other commodities shipped in similar equipment, the value of the shipments being equal or greater than the shipment of sand and gravel, and the length of the haul equal or greater than the haul of sand and gravel with which it is compared.
12—What in your judgment are the most important things for our State Association to take up at this time?

The first step in making a trade association useful is to have an efficient, live-wire secretary. The Ohio Sand and Gravel Producers' Association fortunately has such a one in Guy C. Baker. He is a lawyer and has been closely associated with F. D. Coppock in the organization of the Greenville Gravel Co., which is now operating several plants and building others.

Mr. Baker is making a thorough canvass of the sand and gravel industry of the state. A copy of the questionnaire he has sent out is shown herewith as a guide to other associations in collecting useful information. Questions 9 and 10 are of particular interest because they indicate the beginning of a service which may easily prove of great value to all members. That is the buying, selling and exchanging of machinery and equipment. The object of this work is to make it easy for members to sell or exchange serviceable equipment which they have replaced or outgrown.

Other activities of the Association include a meeting with the actuary of the Ohio State Industrial Commission for discussion of workmen's compensation insurance and accident prevention on June 4 at Columbus, Ohio, and an annual mid-summer convention at Cedar Point, Ohio, July 9, 10 and 11.

The Freight Rate Increase

THE ANNOUNCEMENT of a 25 per cent increase in freight rates was probably not much of a surprise to producers of building materials, but the workings of the order in some instances will cause both surprise and dismay. The present indications are that the new schedules will contain many irregularities similar to those discovered in the recent 15 per cent increase.

That is, for short hauls of class commodities like stone, gravel or sand, a horizontal 25 per cent increase has not been made, but increases in some instances of as much as 100 to 150 per cent are to go into effect, according to present reports. That such increases will have a very serious effect on the crushed-stone and gravel industries is obvious. The case so far as road improvement work is concerned is all the more serious because the Federal Office of Public Roads is about to issue a bulletin advocating the more widespread use of small portable crushing and screening plants.

If there ever was a time when the stone and gravel industries needed strong national associations, or better still ONE STRONG NATIONAL ASSOCIATION it is now. No opportunity should be lost to place these industries on the footing of other recognized industries.

Safety in Stone-Crushing Operations

Monroe Plant of the France Stone Company an Example of Features Which Help Accident Prevention

SAFETY IN STONE QUARRYING, handling and crushing depends upon two main essentials: (1) Safety in design and layout; (2) Safety in operation.

The design and arrangement of plant and equipment have a great influence on safety in operation, and this point should be kept in mind in laying out the plant, as well as economy of operation. For safety in operation now has come to be understood to mean saving in dollars and cents.

Planning Quarry Operations

Quarry layout alone is not generally susceptible of much change. It is largely a matter of adaptation to the local conditions. Nevertheless, in planning for quarry operations there are a few fundamental considerations in the interest of safety.

Special attention should be given to the method of stripping to be employed. The conditions will be dangerous if the face of the ledge has a very steep incline. The stripped surface should always be wide enough so that there is no danger of soil and boulders falling into the quarry. If the stripped surface is narrow or if it slants toward the excavation, a protecting fence should be maintained along the edge of the pit.

The method employed in drilling has an important bearing on safety. Bench work is dangerous because it involves men working close to walls of shattered rock with small chance of escape in case of a slide. Experience has long since proved that deep drilling and working the entire quarry face in one operation is not only the more efficient but the safer method.

Safety in Railway Operation

Handling stone from quarry face to crusher almost invariably means the maintainence and operation of a considerable railway system. Many accidents always occur because of the rough and ready layout and operation of these railway lines. It will pay to keep the track in decent alignment and in fair condition. It will pay to have good rolling stock and to keep it in good condition. Passing tracks should be separated by plenty of space, and a host of other points known to every railway man should receive attention. The accompanying view of the Monroe, Mich., quarry of the France Stone Co., is shown to illustrate just this point.

The view looking down the incline shows heavy rails in good alignment with plenty of space between the tracks at the foot of the incline. Moreover, the space between the tracks is kept clean and smooth. Many accidents occur at the foot of the incline in nearly all stone-crushing plants, and many of these could be avoided by a proper design and by proper maintenance of track and rolling equipment.

Roominess of Crusher House

The group of five views on the opposite page shows the interior of the crusher house of the Monroe plant. Note the roominess. There is all kinds of overhead clearance. There is 25 to 30 ft. clearance around the big gyratory crusher. Here is a structure 60 or 70 ft. square and containing nothing but the dumping incline and hoist, the crusher and an air-operated hoist for handling the crusher hook.

As compared with the ordinary plant, at first glance the place seems strangely empty but it represents a wide range of accumulated experience in the stone-crushing business and the best ideas of expert designers. The superintendent, M. A. McCreery, states that there is not a foot too much space for safe operation.

There is no machinery near, or around, or over, the big No. 21 crusher and there is plenty of light as well as space. A chain hoist over the crusher will handle any of its parts, and enough space is provided on the floor of the crusher house to lay out all the crusher parts and then have plenty of room to move around and work on them.

Dump Cars Handled Mechanically

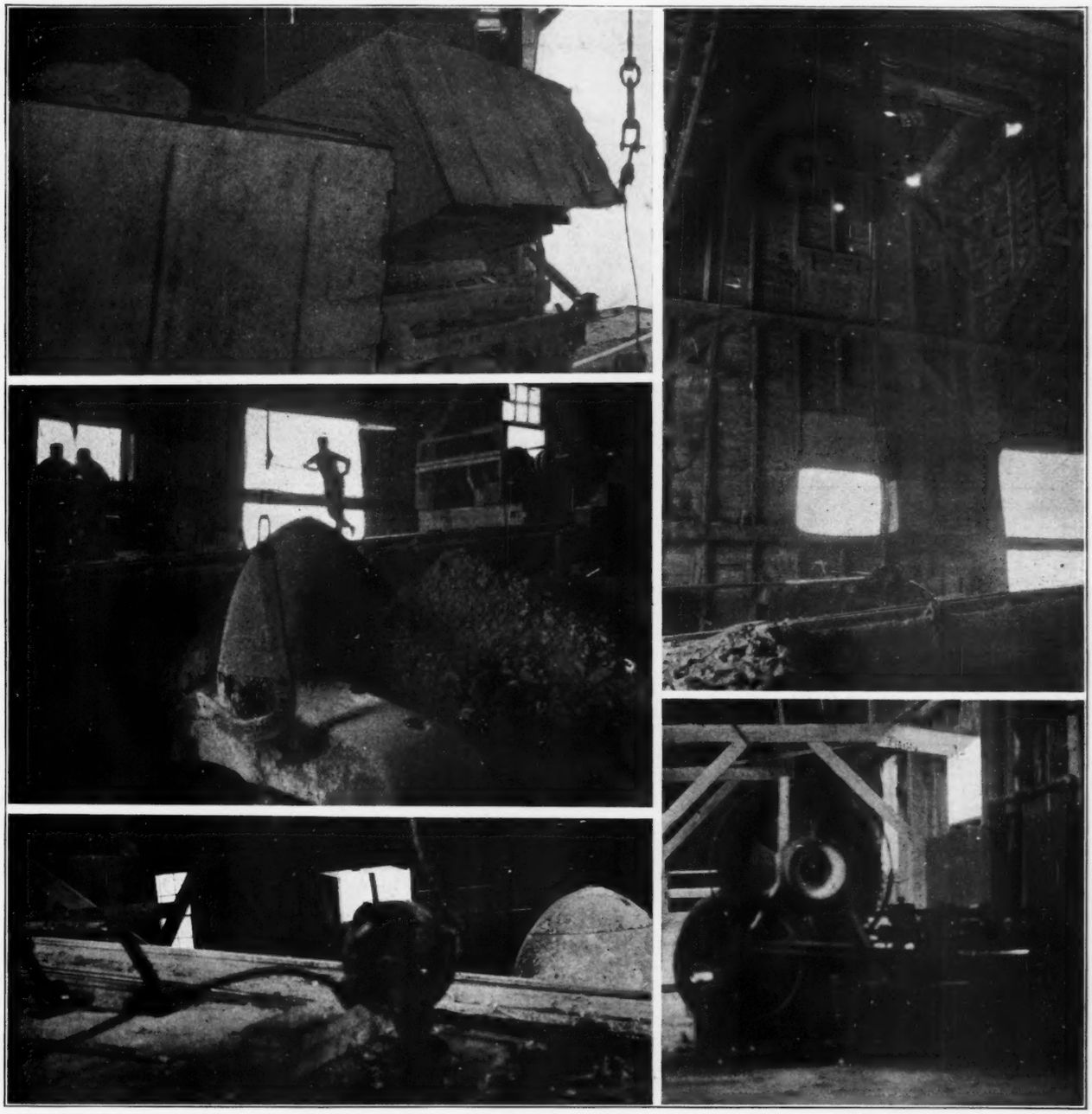
The hoist for hauling the cars up the incline is lined up with the track so that the hoist engineer sees the whole operation. As soon as the cars reach the top of the incline they are anchored to the floor by a simple link device which hooks over the truck frame (shown at the left of the lowest of the three pictures in the left-hand column).

The cars are side-dumping, a line from the main hoist being used to tip them. The cars are righted again by a line from a pneumatic-plunger hoist hung overhead. This line passes under the pulley shown in the view already referred to, and the hoist itself is shown in the upper right-hand view.

Needless to say, mechanical devices for dumping and righting the cars are not only more efficient but prevent many accidents. The overhead pneumatic hoist rights the cars very quickly and avoids sending them down the incline to be righted with a crowbar by the man whose sole duty should be the coupling and the uncoupling of the cars.

For freeing the crusher in case of clogging the hook and hoist shown in the middle picture of the left-hand column and the bottom picture of the right-hand column are employed. The machinery in the plant proper is run by electric motors but this hoist is operated by compressed air because this type of hoist is much more flexible in operation than an electric hoist. Note that the gears of this hoist are guarded — a refinement not often met with in stone-crushing

Incline from quarry, Monroe plant of the France Stone Co. Note alignment and general cleanness of tracks



Upper left—Car dumping from main hoist. Upper right—Pneumatic plunger hoist for righting cars. Middle left—Crusher hook, operated by compressed air hoist, for loosening stone wedged in crusher. Lower left—Clamp and pulley for handling dump cars. Lower right—Air-operated hoist for crusher hook

and stone-pulverizing plants.

Working Space Around Crushers

The last view is given to show the openness and the accessibility of machinery around the four crushers which take the tailings. All parts of these crushers are accessible and there is not only plenty of space but also plenty of light around them. The same features hold true of all the machinery housings, and these features of accessibility, room and light to work about the various machines, are very important ones in making and keeping the good record this plant has for accident prevention.

The Monroe plant of the France Stone Co. has been taken as an example because this company has been foremost in accident prevention work, as well as being one of the largest if not the largest exclusively crushed-stone organizations in the United States. This company is now operating 23 plants with a total capacity of close to 40,000 tons a day. The Monroe plant is one of the newest and from an operating standpoint one of the best and safest of the 23 plants. It has produced 4,300 tons daily in a 9-hour day.

The France Stone Co. has maintained an insurance bureau in charge of D. C. Souders, who has given his whole time to accident and fire prevention. This bureau has succeeded in saving the company $7,800 a year by merely reducing insurance premiums. This saving does not take into account the increased efficiency, the improvement in morale of the workmen, and many other things, intangible in money value, but nevertheless important in the economical operation of the business.

How Saving Was Accomplished

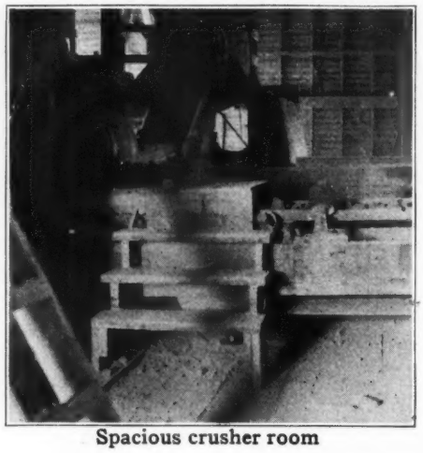
Mr. Souder has furnished the following facts as to how the saving was effected: "In the spring of 1915 we organized a safety campaign and the writer personally took this matter up with our va-

rious plant superintendents, and we also had our steam shovel engineers and mill foremen interested in our movement. With the four of us working as a unit at each plant we have accomplished a great saving in life and limb and it also has resulted in reducing the cost of our insurance.

"One can never reduce accidents by simply tacking up in some conspicuous place a danger sign and then not go further toward protecting the dangerous conditions that exist. A good many accidents occur, that by the expenditure of a few dollars to safeguard a gear or a belt, would have been prevented.

"This same committee is organized for the prevention of fires.

"We have installed water lines with tap and 50 ft. of hose on each floor, and have arranged these water lines so that during freezing weather, when it is impossible to heat our buildings, the turning of a valve gives plenty of water in the mill. During the summer months this valve is not used and the water line has a continuous pressure on it. We have also installed non-freezing fire extinguishers, also barrels and buckets and oil waste cans. We have taken all the oil out of our mills and also have instructed our mill foremen to install drip pans and see that all combustible materials, such as oily waste and old greasy clothing of the workmen are deposited in the waste cans and taken from the mills. Regular inspections are made to see that these rules are enforced.



Spacious crusher room

"Along these lines of fire protection, we have placed our plants in such a condition that the Ohio Inspection Bureau has given us a great reduction on our first insurance. The cost of doing this work was paid for by the first year's saving on fire insurance and this saving is effected from year to year."

Bonus System in Accident Prevention

A Practical Suggestion by the California Accident Commission to Conserve Man-Power

EDWIN HIGGINS, safety and efficiency expert for the California Metal Producers' Association, who was formerly chief mine inspector for the Industrial Accident Commission, said recently:

"I believe the bonus system for the foreman has a great deal to do with the decrease of accidents. You can get a lot of foremen together and give them a strong talk about safety and they are not very much interested or enthused, but if you begin to talk about a little money for the men that have the fewest accidents, you immediately get a different kind of a response.

Equitable Competitive Plan

"I talked over the bonus system with the superintendent of one mine as a means of decreasing the great number of accidents he was having. He was not much in favor of it and did not care to give it any consideration. A year later I called at the same mine and was surprised to find an amazing decrease in the number of accidents. I asked him what he had done and he said: 'Nothing much of anything,' and I could not get any satisfaction out of him.

"Later on I learned that he had put in a bonus system and the reason he would not tell me about it was on account of the small amounts he was paying as bonuses to the foremen. This bonus was $5 per month for the foremen with the best record."

Care should be exercised in working out a just arrangement so that all competing foremen will be placed on an equal basis, for it would be unfair to expect one hundred workmen in a foundry, for instance, to have as few accidents as a like number of workmen shoveling sand. In some plants, every foreman is allowed a certain definite amount per man for each of the workmen under his control who goes through the month or the year without a lost-time accident.

Protection of Workmen an Economic Necessity

The problem of preventing injuries to workmen has always been one well worth the attention of employers, but now, in the face of the abnormal conditions connected with the war, when production is essential, it has become even more of an economic necessity for the lives and limbs of our industrial army to be looked after with especial care. Upon even the slightest investigation it becomes apparent that an injured workman breaks a link in the chain of production, and results in a direct loss, first, to the man himself, and, next the immediate loss while his place is being filled, and, still further, the loss due to breaking in the new man in his place. Hence it is essential that every effort be exercised to prevent accidents, and the bonus system is here cited as one of the known means which have brought results.

Practice What You Preach

IN many instances superintendents and foremen, considering themselves as having more "official authority," violate rules that are set up for employes. Now, many men are influenced by the actions and example of their leaders; hence if foremen or superintendents assume an unconscious indifference toward the importance of Safety First rules, it can hardly be expected that employes will attach great importance to educational notes, posters, or notices.

Get Busy—Use the Present Lull to Prepare

NOW is the time to prepare for emergencies which may arise. It is reasonable to assume that after the war production will increase very rapidly. That means a considerable number of new men will have to be employed.

Don't Wait—Start Now

Get your safety organization in such shape that at least all your present steady employees are conversant with the danger points to which the new men who are to be employed will be exposed. When forced to shut down by lack of cars use the time to good advantage by adding safeguards to your plant.

A thorough inspection should be made to search out those danger places which are not otherwise noticed or given attention. All stairways, platforms, runways, etc., should be inspected, repaired and new ones put up where they are needed. The entire plant should be given a general house cleaning and all rubbish and old material removed from corners and out-of-the-way places. Guards should be placed about belts, gears and other danger points. The time to do it is during shutdowns when the machinery is not in motion.

Don't wait for an accident. Do it now.

Five Fundamentals of Safety Work

Paper Prepared by a Member of the National Safety Council: Largely a Matter of Education and Organization

THE men who are lifting the world upward in industry are the men who have visualized the safety needs of the humblest of the toilers—men who believe in encouragement rather than in criticism. It has been given to these leaders in the movement to formulate five fundamentals, the observance of which has absolutely demonstrated that three-quarters of all of the deaths and serious injuries in the industries may be eliminated. Good ethics is good business, and the conservation of the human equipment of the plant pays the most satisfactory of dividends; therefore, safety campaigns have been incorporated into the efficiency movement and are an indispensable part of efficient organization.

To the surprise of those who were early in the work, it has been demonstrated that about 65 per cent of the remarkable results achieved in saving human life has been accomplished entirely outside of anything that can be purchased with money or built with iron or steel or wood. Two-thirds is a matter of education and of organization, and but one-third of the reduction in accident prevention is secured as a result of mechanical safeguarding.

The first requisite in safety work is to convince the general manager—the man who holds the pocketbook—and get him intelligently interested; he must be actively and continuously identified with the movement from its initial stages. If the manager is half-hearted in his support no real start can be made.

Winning the Confidence of the Men

To illustrate the value of personal activity on the part of the plant manager here is a concrete example. A few years ago a safety campaign was launched in a small city in Wisconsin. The manager was a fine, square type of executive, a graduate of an engineering school and anxious to do the right thing by his men. The meeting was held one Sunday afternoon and about 150 foremen and workmen were present. Little time was spent in preliminaries. After the meeting was called to order, the manager took the floor and said:

"During the six years I have been your manager, several men have been killed and a number of others have been seriously injured. These accidents would not have occurred if I, as general manager, had done my part. I am sorry to say it, but it is true. Men have also met with accidents who never would have been killed or injured if you men had done your part. We have both fallen down, boys. We know what other companies all over the state have done in saving human life, and, if they can do it, so can we. Tomorrow morning this company is going to start a safety compaign, and I want every man in this room to start, when the whistle blows, to help in the movement. I expect every foreman and workman to do his part. I assure you, as the general manager of this company that anything that money can buy to protect human life in this plant will be forthcoming. I will go the limit if you will go with me."

In a short time the plant became one of the model workshops of the state. The manager had gripped the situation and every foreman worked with him. Confidence was established, and every man in the shop offered helpful co-operation. Continued activity on the part of the manager is essential and if this effort is systematized excellent results are certain to follow. Here is a case in point:

The general manager of a large plant in Pennsylvania is intensely interested in safety and every month takes one department and closes it down at twenty minutes to twelve. He pays the department a personal visit and tells the men what the company is trying to do, what they are willing to attempt, what the workmen have lost during the last month in wages and suffering from accidents, and asks them to pull with him. This has proven a most effective means of putting life and interest into the movement.

All the work, however, does not rest on the shoulders of the manager. It is essential to teach the foremen who are intelligently interested—I mean those who are convinced that safety has arrived—that safety is not just a little outside frill, but that it is an inside proposition; that it is a part of efficiency; that a foreman who has any respect for himself or any ambition as a foreman ought to give it his hearty support. In the last analysis, the attitude of the foremen absolutely determines the attitude of the workmen.

Initial Stages of Safety Work

How can you get your foremen interested in the initial stages of safety? Here are a few suggestions:

First, have a meeting of the foremen and at this meeting the superintendent and manager should be present. Have them place before the foremen, very simply and very plainly, what has been the splendid experience of other companies; what reductions have been made, what money they have saved, how the great safety movement has arrived and is recognized everywhere as a legitimate part of efficiency. At that meeting put safety on the map and give every one of the foremen to understand that from that time on he is expected to do his part along these lines, just as much as he is expected to do his part in fire prevention or anything else that prevents waste. Make it unmistakable; make it sound like an order.

Second, at that meeting, or at the first two meetings in the initial stage, agree on a definite program; agree on the first twenty-five points in the plant to be guarded; agree on the standards for guards, the education and organization features that are to prevail, and the rules that are to be adopted. Take the foremen into the proposition from its earliest stages, so that the educational features, the form of organization, the rules and the points to be guarded will have been considered by them and they will have had a voice in formulating the standards.

The **third** most important of the five indispensables in accident prevention is the employment of a safety engineer or inspector.

Bulletin Boards

What is the **fourth** of the five topics in the series? Bulletin-boards. The bulletin-board, by means of pictures and stories

Literature on Quarry Accident Prevention

THE UNITED STATES Bureau of Mines, Department of the Interior, has investigated quarry accidents for a number of years and several of its publications will be found useful to crushed-stone operators in accident prevention work.

The 1916 report, "Technical Paper 193" on "Quarry Accidents in the United States," compiled by Albert H. Fay, will be found to contain many valuable suggestions on quarry accident prevention as well as the complete statistics from which quotations were made in ROCK PRODUCTS of May 22.

Most of the other literature of the Bureau of Mines relates more specifically to quarrying cut stone, but much valuable material is contained in it for crushed-stone producers. These publications are: "A Primer of Explosives for Metal Miners and Quarrymen," by Chas. E. Munroe and Clarence Hall (Bulletin 80); "Selection of Explosives Used in Engineering and Mining Operations," by Clarence Hall and Spencer P. Howell (Bulletin 48); and "Safety in Stone Quarrying," by Oliver Bowles (Technical Paper 111). These publications may be obtained for the asking by any crushed-stone operator.

showing how men have been injured, helps to keep everlastingly uppermost in the mind of the workman what he can do to protect himself. It is one of the indispensable features in securing what all of us are so anxious to accomplish, namely, to continuously, year by year, maintain interest in safety and not let it end in a spasm.

Now for the **fifth**—workmen's inspection committees. The way to get a workman interested in safety is exactly the way to get a man interested in a political party or in a church or anything else—give him something to do; give him some little recognition, some little authority. In every plant where they have organized workmen's committees and have really encouraged them in the way they ought to work, the records of the National Safety Council show that satisfactory results have been achieved.

It may be argued that workmen's committees will make impracticable suggestions. This may be found true, possibly, at first; yet the history of the safety movement proves that from 90 to 95 per cent of the suggestions offered by the committees—when the committee is properly organized, instructed and encouraged—are logical and acceptable. Out of 6,000 suggestions offered by the men on a western railroad, 5,700 were approved and placed in effect.

Selecting the Safety Committee

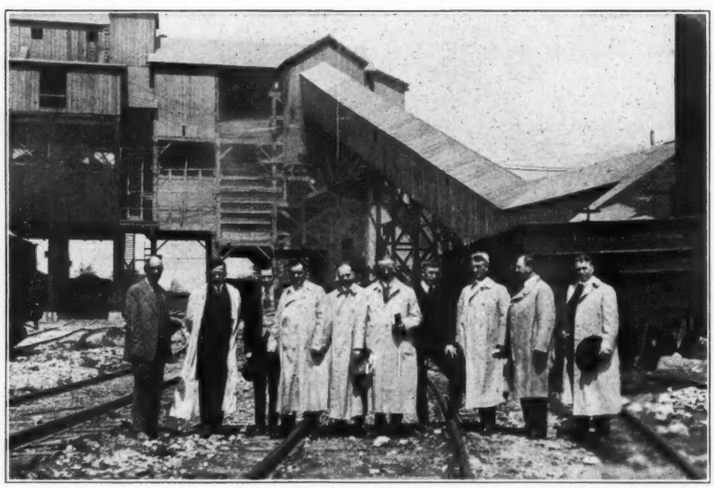
In selecting the initial committee for a plant of 150 or 200 men, a group of five men will answer the purpose, drafted from the several departments. In larger establishments, it is well to organize a small committee in each section or department and then form them into one general committee. Appoint them for a three-month period as a try-out and carefully instruct them in their work. Give them full liberty to make complete inspections and furnish a clerk, if necessary, to draft their findings into proper form. Don't overlook the foreman—his co-operation is essential to the success of the work.

One of the main features of the work, and one that has an important bearing on the subject, is the fact, often overlooked, that the men acquire first-hand information on many points difficult of explanation by foreman or superintendent. There is no method so convincing to a workman as to place him in a position where he must reason out cause and effect on his own initiative. This is a prime reason for occasional changes in the personnel of the committee, and many executives have found it advantageous to appoint rather large committees in order to drive home this important phase of the work. It has also been found advisable, in many industries, to place the superintendent or general foreman at the head of the safety committee—the only permanent member—and fill all vacancies as they occur at stated periods by popular election in the several departments.

These are the methods generally employed to secure results in accident prevention work. Many variations are recorded to meet peculiar conditions, yet the results are invariably the same, differing only in proportion to the skill and enthusiasm of the directing force in securing co-operation on the part of foremen and workmen and the driving home of the educational lesson that two accidents out of every three are needless and could and should be prevented.

Begins Inspection of Ohio Quarries for Safeguards

A STEP toward making quarrying and stone crushing a real industry was made when the Ohio Macadam Association voted to coöperate with the State Industrial Commission to reduce accidents and cut down the cost of workmen's compensation insurance. So far as is known the Ohio quarrymen are the first organized group of men in the stone industry to take such a step.



The accompanying picture shows representatives of the State Industrial Commission, of the Ohio Macadam Association's committee and officials of the Marble Cliff Quarries Co. inspecting the plants of the last mentioned company near Columbus, Ohio. In the group are Victor T. Noonan, Safety Director; T. P. Kearns, Chief Factory Inspector; and P. F. Casey, Rating Actuary of the State Industrial Commission. Representing the Ohio Macadam Association are A. P. Sandles, Secretary; Robt. H. Pausch and D. C. Souder. The last two and Mr. Casey form the committee of three which is to inspect and report upon Ohio quarry and stone-crushing practice. In the group are also W. J. Keever and General Superintendent Patnoe of the Marble Cliff Quarries Co. Mr. Patnoe was until last winter with the Dolomite Products Co. at Maple Grove, Ohio.

Out of this inspection it is expected many rules and suggestions for safer operating methods will grow. It is the first time that state officials have given much attention to safeguarding stone-crushing plants, so the quarrymen are by no means the only ones to blame for not showing more interest heretofore.

How to Secure and Retain Interest in Safety

FIRST, provide a comprehensive safety organization, consisting of officials and workmen, because if your safety work is going to be a success you will have to make it everybody's job

Provide books of safety rules, printed in the various languages spoken, and hold examinations on the rules after the man has had time to study them. It is a good plan to have these examinations conducted by members of Workmen's Safety Committee. Give a Safety First button for proper knowledge of the safety requirements.

Have each foreman appoint one of his men as a Safety Overseer. In addition to his regular work, this man is also on the alert for dangerous conditions and practices, reporting the same to his foreman. The man selected to fill this position should be given a distinctive badge. Have monthly meetings of all Safety Overseers to discuss safety matters.

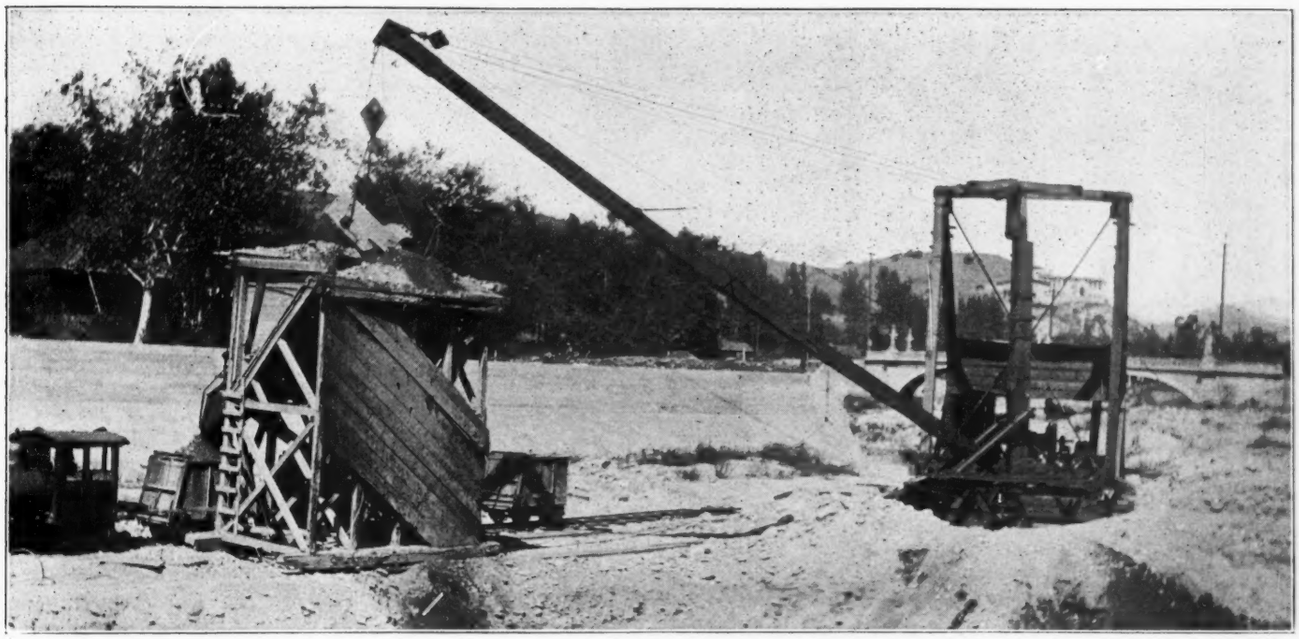
Place one or more bulletin boards on plant roadway and in each department. Display upon these boards material which will keep the men interested in accident prevention.

Advertise Safety by the distribution of watch fobs and Safety trinkets as prizes.

When foreigners are employed have a man versed in the language spoken call upon the new employe, and, in conjunction with his foreman, talk to him about his duties and about being careful in his work.

Gravel Shovel Which Travels on Skids

Los Angeles Company Digs Channel and Furnishes Aggregate for Retaining Walls in One Ope ration



The electrically operated shovel which moves on skids an d the hopper on rollers; the 4300-ft. wall is seen at the left

THE LOS ANGELES SAND AND GRAVEL Co. has been co-operating with the City of Los Angeles in the construction of two retaining walls along the Arroyo Seco. Material for the aggregate is gotten directly out of the bed of the stream by an electric shovel which supplies the material for the walls as the work proceeds by pulling itself along the channel it digs for itself. One wall is 4,300 feet long and the other is 1,000 feet. The former wall approaches to within a short distance of the crusher plants of the sand company.

The electric shovel is mounted on skids. By means of an extra winch mounted on the shovel, together with a pulley anchored at the proper distance, and a cable connecting the two, the shovel is able to pull itself along, bringing new gravel deposits within reach. Thus no time is lost in using rollers.

This shovel starting at a point near the crusher worked itself the entire length of the wall, digging the bed of the arroyo

The conveyors on cables and the tunnel wh'ch extends under the pile of sand and rock

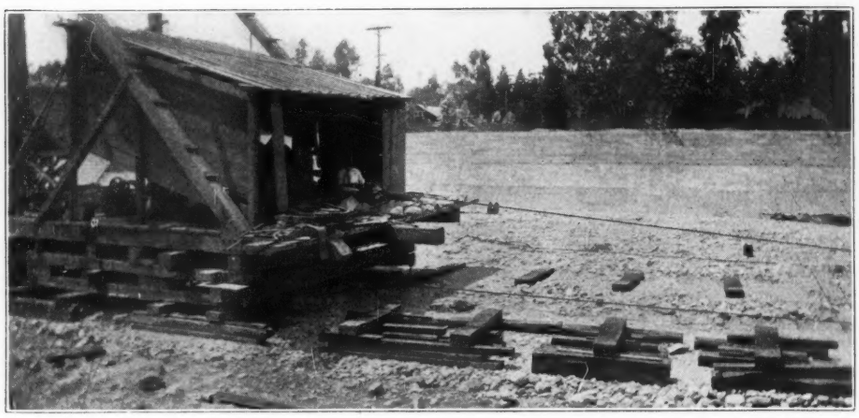
from 5 to 20 ft. deep. This accomplished two things. It made the bed of the stream deeper, which would tend to lessen the chances of high water flooding the surrounding territory, and saved the city the necessity of making excavations for the wall. As the gravel was dug up a sufficient amount was piled along the bank of the stream to build the concrete wall. The bed of the stream is owned by the gravel company.

Must Work in Dry Season

The arroyo is dry about nine months of the year, and it is necessary to gather large quantities of material to last through the wet season when the arroyo is flooded and it is not practical to work in the bed.

Before the wall was built and the bed lowered, many houses were washed away from both banks of the stream during floods every year.

The loading hopper and shovel beyond



No rollers for this shovel; the skids are greased, and as the shovel is moved forward, it is ready at once to begin excavating

Rear view of shovel

A number of labor saving devices have been installed by this concern. The dump cars that transport the material to the crusher run on a narrow gauge track, which extends the length of the wall. A small engine draws the cars from the point of excavation to the base of an incline near the crusher. The dump cars are drawn up this incline one at a time and dumped automatically at the top of the incline into the crusher.

Shovel digging into channel bed

How Car Is Unloaded

Two small supplementary wheels are mounted on the extended ends of each car's rear axle. On reaching the top of the incline these wheels start to travel up slanting beams and so tilt the load forward. At the same time a catch holding the door at the front end is released and the stone and gravel is discharged.

For the purpose of providing conveyors whose range can be extended as the piles of sorted material grow, sets of cables have been stretched from the crusher to points beyond the piles. Frame sections are laid on these wires to form suspended supports, to the end of which the sand and stone are carried and dumped.

Trucks Loaded in a Tunnel

In order that the sorted material may be easily loaded for delivery to purchasers, a tunnel has been built beneath the piles, with top and sides reinforced with 8-inch square beams, placed 4 inches apart. Into this passageway the delivery trucks are driven and then loaded by opening a slide and letting the desired amount of sand and gravel fall through into the vehicle.

Sand and Gravel Concerns of San Antonio Busy

SAN ANTONIO, Tex.—San Antonio is the home office of a number of sand and gravel concerns which furnish a vast amount of material to the entire state. One of these, the Wagner Sand Co., has two pits, which employ from 25 to 30 persons and ship 150 carloads a month throughout Southwest Texas.

The Texas Trap Rock Co. ships for roads, pavements and for use in concrete buildings. They employ 70 persons.

The Uvalde Rock Asphalt Co., with a total of 130 employes, is furnishing its product to the whole southern part of the state, supplying material for road contracts from Eagle Pass to Beaumont. This company has done considerable Government work at Brooks Field, and is now working on a state highway contract on the Austin-Williamson Road.

The Cibolo-Gravel Co., whose pits are at Luxello, 20 miles north, ships all over the state. The total output for the year is 3,600 cars.

The San Antonio Sand Co. and C. W. Ling do chiefly a local business.

New Plant of Kelley Island Company at Buffalo, New York

Equipment of Up-to-Date Lime and Pulverized Limestone Plant—Concrete and Steel Construction Throughout

THE NEW PLANT of the Kelley Island Lime and Transport Co., at Buffalo, N. Y., which started operating the week of April 15, will be the third largest plant of the company. This plant when completed will be one of the most modern lime plants in the United States. No expense has been spared in making it the last word in design and equipment.

Situated in the city of Buffalo between the Hamburg Turnpike and the Buffalo River, it comprises 3½ acres of land and has a dock frontage of 500 ft. on the river, where the largest lake vessels can tie up and unload the raw material. This stone will be brought from the company's quarries at Kelleys Island and in Michigan.

Buy Large Acreage of Limestone

The company's large quarries at Kelleys Island have been in operation since 1885, and recently the company purchased 2,000 acres of high calcium limestone land a mile west of Rogers City, Mich., which will be developed at once by installing a large crushing plant using a 6x7-ft. Edison roll with a capacity of 20,000 tons per day.

F. A. Jones, Manager of Operations, under whose supervision the Buffalo Plant was designed and constructed

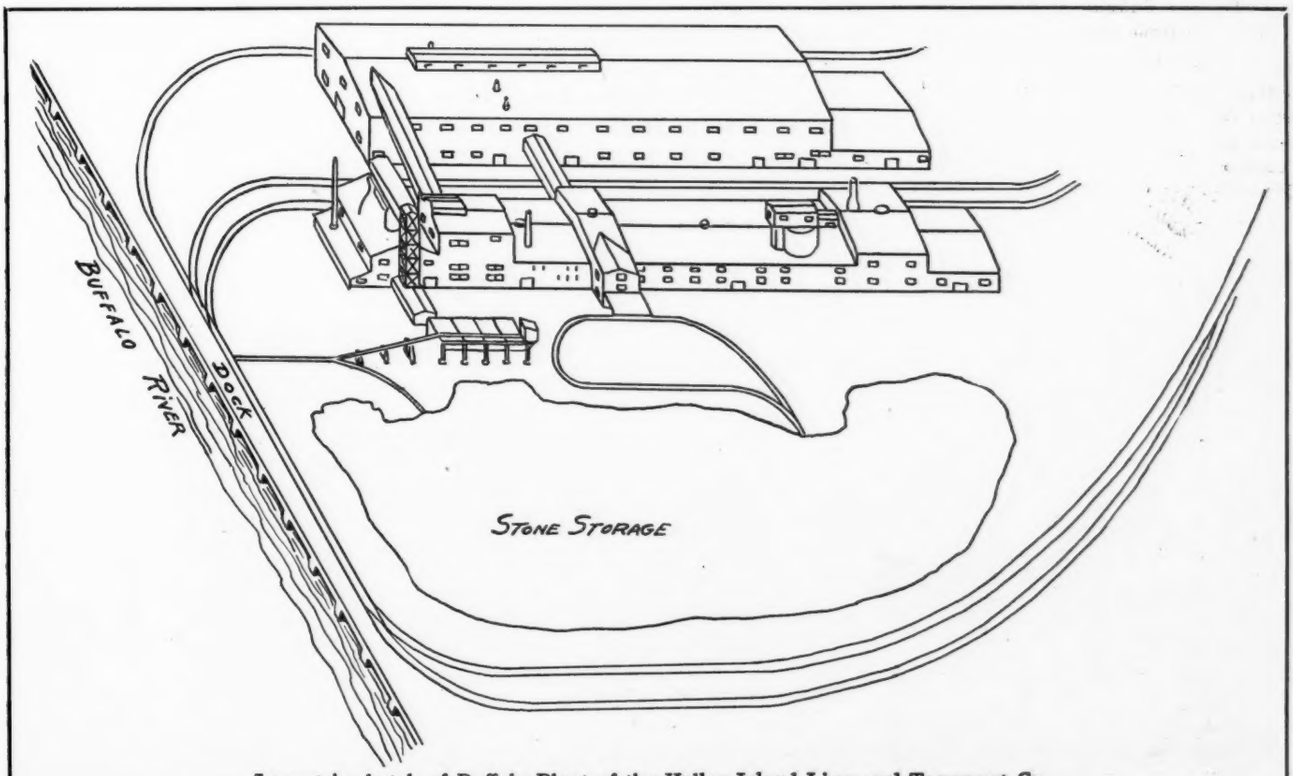
Immense Storage Facilities

Stone is brought by boat from the quarries and unloaded on the dock at Buffalo, where the company has storage facilities for 300,000 tons. This is sufficient to carry the plant over the winter months when navigation is closed.

At the mill will be manufactured all grades of lime products, consisting chiefly of agricultural ground limestone, agricultural hydrated lime, masons hydrated lime, building lime, lump lime and high calcium lump and hydrated lime for the chemical industries. The agricultural ground limestone department is now in full operation and is making regular shipments daily, and the rotary kiln will be turning out calcined lime about July 1.

May Double Plant Capacity

The plant when completed will have a capacity of 500 tons of agricultural ground limestone per day, 125 tons of lump lime and 150 tons of hydrated lime, which will be increased as the trade warrants. The



Isometric sketch of Buffalo Plant of the Kelley Island Lime and Transport Co.

Steel-frame rotary-kiln building in course of construction

whole plant has been designed to double the capacity without a single change in the elevating and conveying systems, as all these have been designed for a capacity of double the amount they are at present handling.

Simplicity in design and in economical operation has been the keynote in the make-up of the whole plant, as all the plans were prepared and the construction done under the supervision of the company's own engineering department, and with twelve plants in operation and years of experience, the engineers have picked out the best and eliminated that which experience has taught them is not of the highest value in operation.

The new Buffalo plant has some new departures from ordinary lime practice—the buildings are all steel construction, and all storage bins and coal bunkers are of either steel or reinforced-concrete construction. The buildings are all covered with galvanized corrugated Middleport or Toncon iron and are fireproof throughout.

Handling Raw Stone—Automatic Feeder

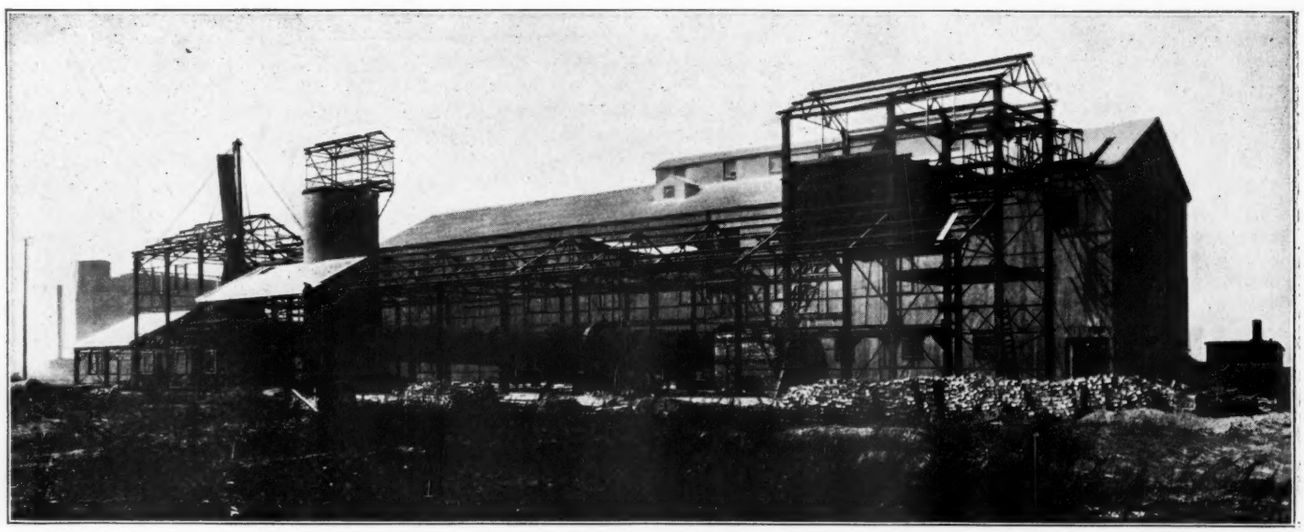
The limestone is unloaded on to the dock and storage pile, and is carried into the mill by a 16-in. belt conveyor. The method of loading from the storage pile on to the belt conveyor is accomplished by using a 30-ton locomotive crane handling a 1½-cu. yd. bucket. The stone is deposited in a movable hopper over the belt conveyor. This hopper has a capacity of 8 tons, and underneath is an automatic ore feeder which is driven by a direct connected 2-h. p. electric motor. This feeds the stone regularly on the belt at any capacity from 10 to 50 tons per hour.

The stone is conveyed and discharged into an elevator just inside the mill, which elevates it into a steel storage bin over the dryer. This bin has a capacity of 200 tons. From the storage bin the stone is again fed automatically into the dryer, which is a large size direct and indirect heat dryer with a capacity of 50 tons per hour.

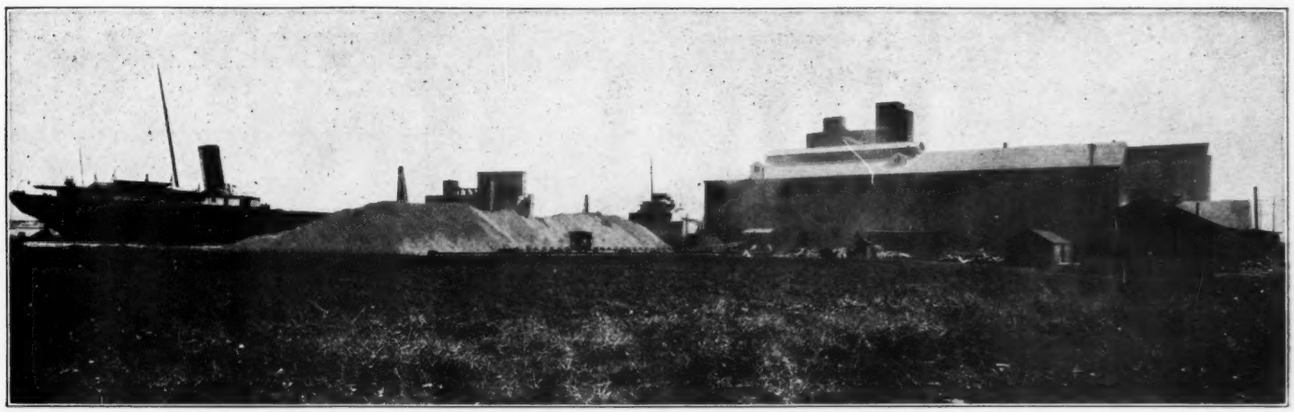
The dryer is fired with a Jones underfeed stoker, which is so graduated that a constant heat can be maintained at all times, and in addition burns all the smoke so that the stone is discharged from the dryer uniformly dry and with no discoloration from the coal. The dryer is operated by a 40-h. p. motor, which drives the dryer and fan. This fan furnishes the means of conveying away all the moisture in the shape of steam. This in turn is put through a centrifugal dust collector, and all the limestone dust is separated from the hot gases and steam and deposited in a separate bin, from which it is stocked and sold for asphalt dust and all other purposes where very finely pulverized limestone is required. All of this dust will pass a 200-mesh screen.

Pulverizing Plant

After leaving the dryer the stone is elevated into a revolving screen where all the fine material under ½-in. is screened out and deposited in another 200-ton bin to be ground into agricultural limestone. The material passing over the ½-in. screen is carried by a 14-in. belt conveyor over to the rotary kiln building and there stored in a 200-ton reinforced-concrete bin to be fed into the rotary kiln and calcined into lime.



Rotary-kiln installed in fireproof steel-frame building



General view of new Buffalo plant, showing outside storage facilities

The small stone or dust is automatically fed into a steel storage bin over grinding mills, and from there is passed through the mills and ground so that all will pass a 12-mesh screen. From there it is again elevated and carried by screw conveyors, either direct into the cars, when loading bulk orders, or is deposited into a packing bin of 50 tons capacity, underneath which is located a packing machine for filling paper bags.

The balance of the pulverized limestone is conveyed over and deposited in three large circular reinforced-concrete bins having a capacity of 300 tons each. Underneath the bins is a large tunnel with a screw conveyor which feeds into an elevator. The elevator delivers to enclosed chutes which in turn deliver the dust to a packing bin or load direct into the cars.

Gas Producer for Kiln Fuel

Going over to the rotary kiln building, as stated above, all the stone running from ½ to 1¼-in. is deposited in a large circular reinforced-concrete bin having a capacity of 250 tons, and is here fed automatically into the rotary kiln, which is a heavy duty 8x150-ft. type.

This kiln is fired by a large modern revolving, automatically fed-and-raked gas producer. It has a capacity of 40 tons of gas coal per day of twenty-four hours. The coal is unloaded from hopper cars direct to a large crusher underneath the track, where it is crushed to 1-in. size and smaller, and is then elevated and stored in a 150-ton steel coal bunker, where it feeds by gravity into the automatic feeder of the gas producer.

Steam From Waste Heat of Kiln

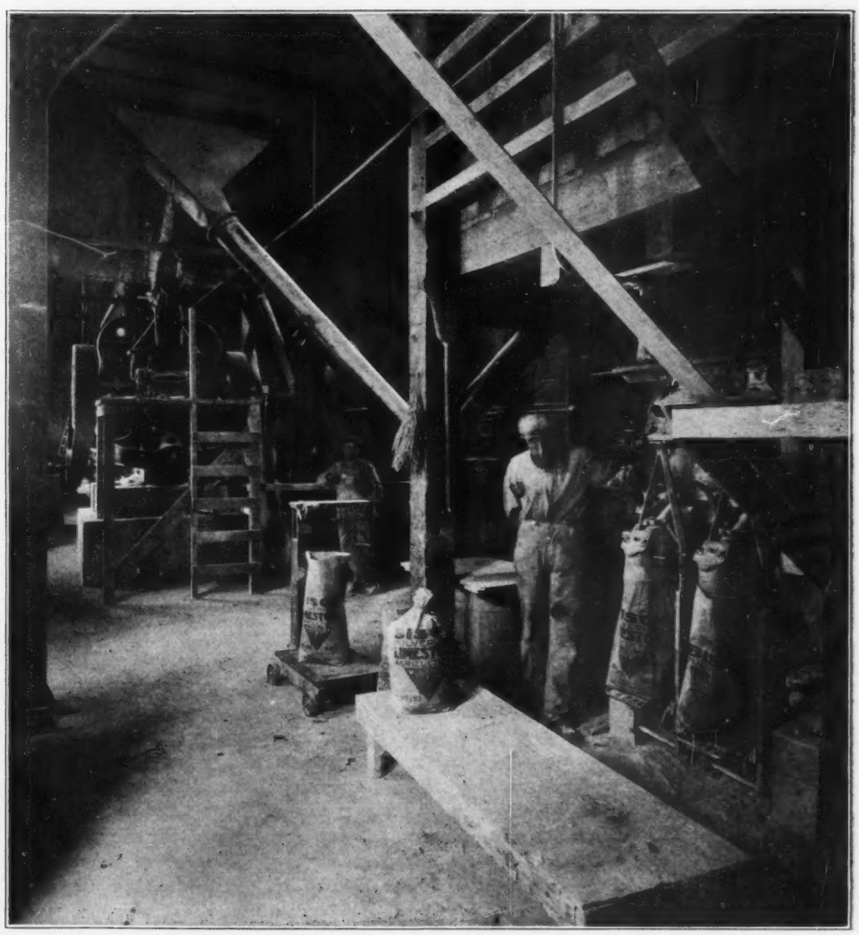
Installed at the end of the rotary kiln is a 400-h. p. upright water-tube boiler, which receives the hot gases as they pass from the kiln. This boiler is capable of generating 200 h. p. of steam at 150-lb. pressure from these waste gases, which in ordinary practice are allowed to escape by the stack and are wasted.

This boiler is also equipped with grates and furnaces so that it can be hand fired in addition to utilizing the waste heat, and it is capable of developing 500 h. p. The power thus generated will be used for blowing the gas producer and to furnish additional power in the future when other kilns and mills are added to the plant.

Handling the Calcined Lime

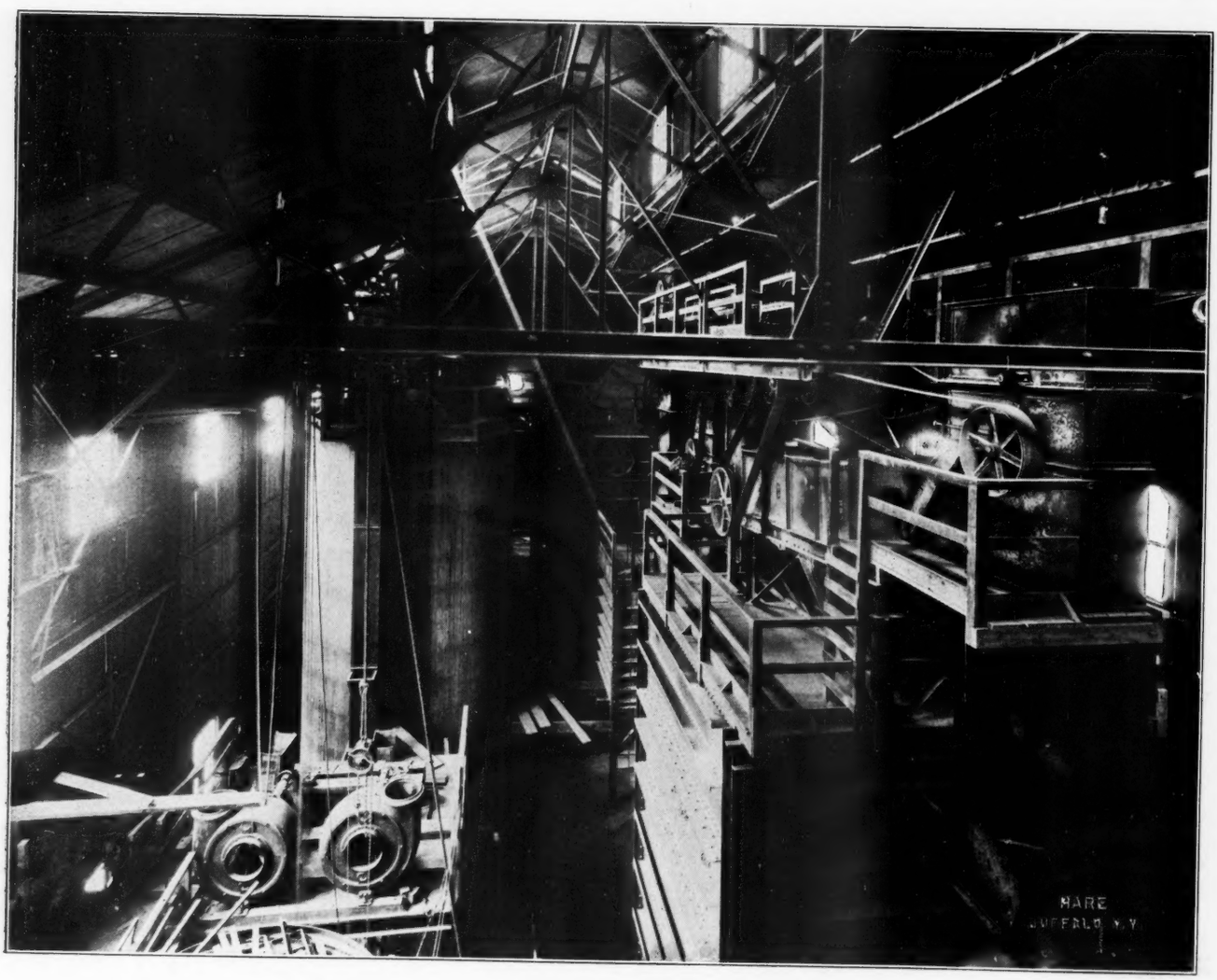
As the hot lime leaves the kiln it is elevated and passed through a large 7x70-ft. revolving four-compartment cooler, where it is cooled down to a low temperature before passing over to the hydrating mill. This cooler is large enough to take the product of two 8x150-ft. rotary kilns so that in the future to double the capacity it will be necessary to install only the kiln.

From the cooler the lime is again elevated and discharged to a 14-in. belt conveyor, where it passes on a bridge over the railroad tracks and is deposited into a large rectangular reinforced two-compartment storage bin, each compartment being capable of holding a day's run of the kiln. The lime is then drawn through gates in the bottom of the bins and carried forward on a 14-in. belt conveyor over to a swing hammer mill and there ground fine for hydrating, or it can be bypassed around



Bagging machine of agricultural limestone department-pulverizers in background

One of the Quarries; and Interior Views of the Buffa



This White Rock, Ohio, quarry and plant of the Kelley Island Lime and Transport Co. is one of the several furnishing material for the new Buffalo plant

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At left—View showing completed agricultural lime department on right and hydrated lime on left

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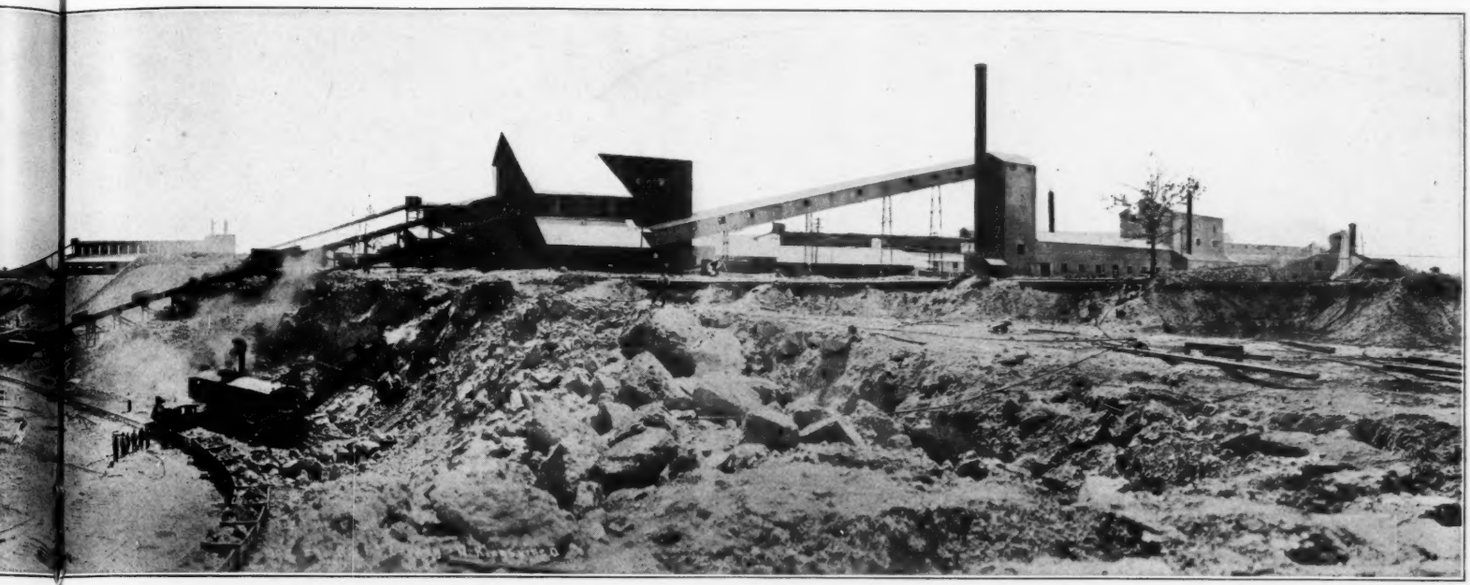
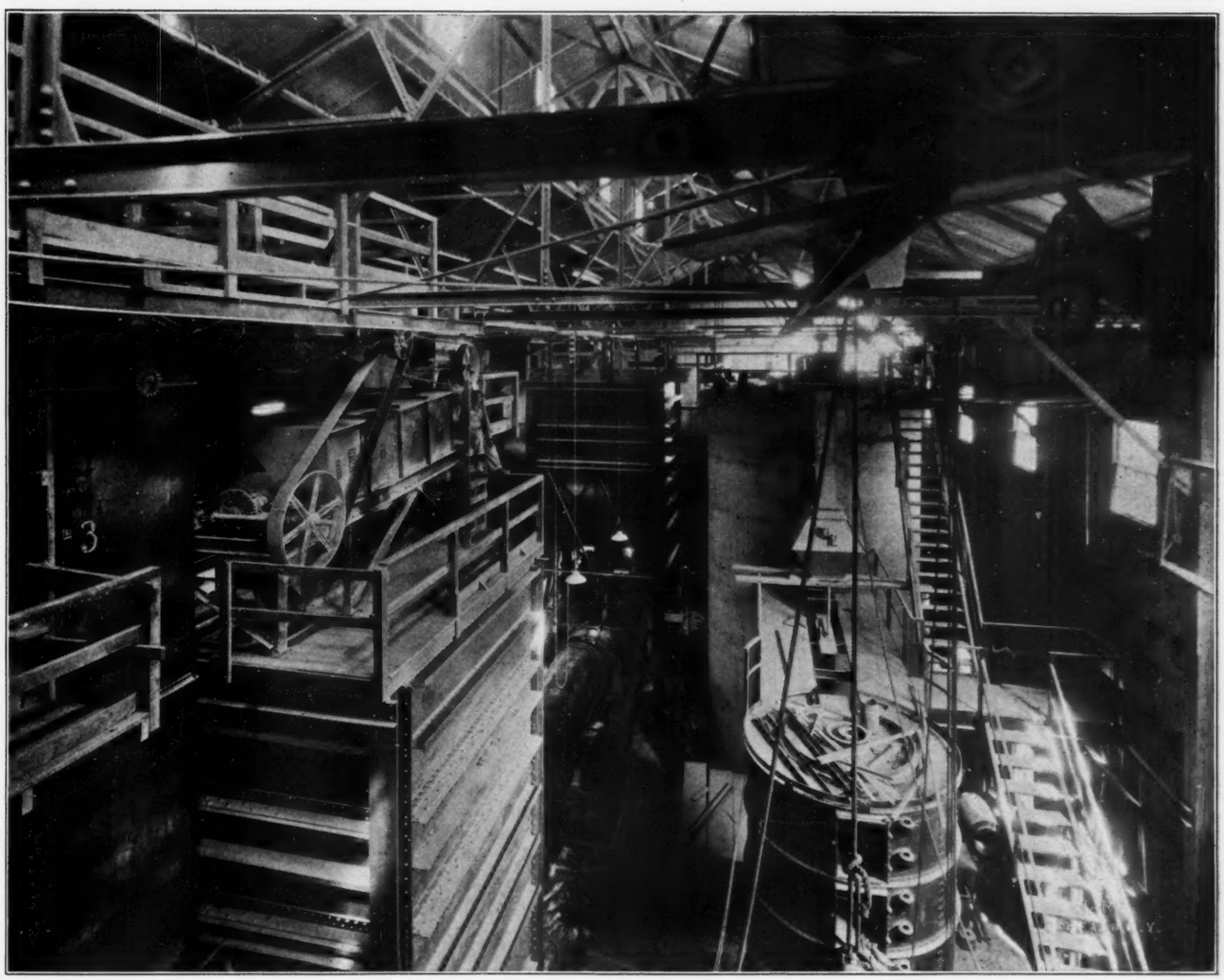
At right—View showing the completed agricultural limestone plant at left side of picture [redacted] drator and concrete storage bins at right

e Buffalo Lime Plant of the Kelley Island Company





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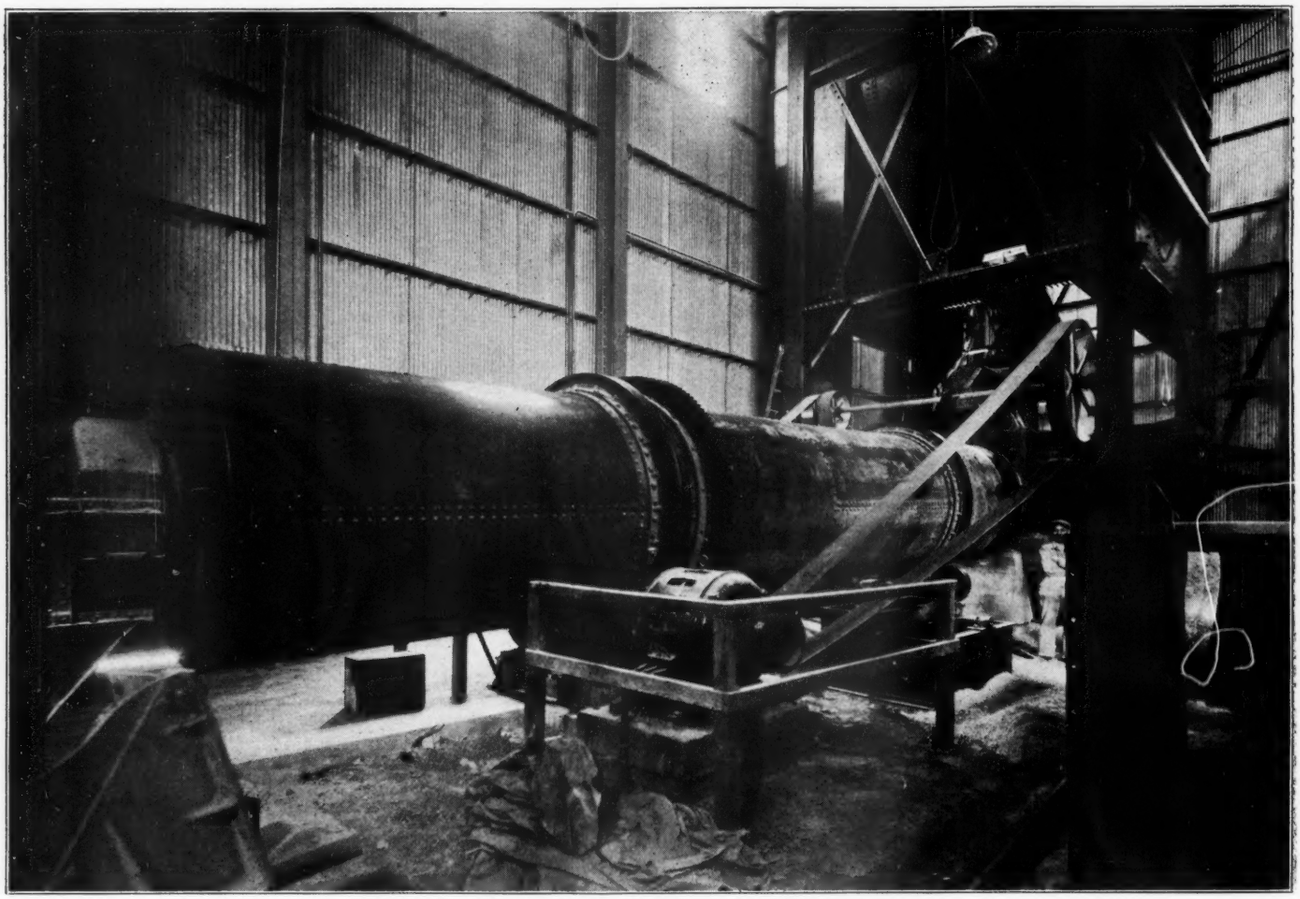
At right—View showing the completed agricultural limestone plant at left side of picture

rator and concrete storage bins at right



Dryer with steel storage bins for raw stone

the hammer mill and carried up by an elevator and discharged direct into the cars for bulk lime shipments.

The lime after passing through the hammer mill is elevated and discharged into a large reinforced-concrete storage bin having a capacity of 150 tons, and is carried forward over the poidometer which automatically weighs the lime and water and is discharged into a hydrator, having a capacity of 12 to 15 tons per hour.

After being properly hydrated the lime is passed through two large grinding mills where it is finely ground and air-floated, after which it is elevated and discharged into four large circular reinforced-concrete bins of 200 tons capacity each, or is discharged direct into large packing bins underneath which are located two 4-tube bag packing machines, which automatically fill and weigh the bags ready for shipment.

Flexibility a Notable Feature

This description completes the whole process of manufacturing ground limestone and lime in its various finished grades. It will be noticed that every department is made very flexible. All machines, elevators and conveyors are driven by independent motors, and on account of the large storage systems for both the raw material and finished product, any department can be run from twenty-four to forty-eight hours from storage, so that ordinary repairs or breakdowns can be taken care of without affecting any other department than the one where the repairs are being made.

The bins will carry inside the mill nearly 700 tons of raw stone both wet and dry; the lime bins will carry 450 tons of lump lime for hydrating. Besides this, there is storage capacity for 750 tons of finely pulverized ground limestone and 800 tons of finished hydrated lime. This arrangement of large storage capacity, while expensive to install, assures the most economical and continuous operation of the whole plant.

Offices and Plant Operation

Just adjoining the plant is erected a large concrete and tile building, which will be stucco plastered and will contain in one end the main Buffalo office of the company; the center of the building will be used as a store room to carry a stock of mill supplies and extra machine parts. One corner is partitioned off into a fireproof room, in which is located the switchboard, meter and distributing panels to all departments of the mill, so that a cost record can be made of the power used in any department. Just outside of the switchboard room, and roofed over, are located three 150-k. w. 2200 to 440-volt transformers which take the current from the main line of the Buffalo General Electric Co. and transform it down to 440 volts for general distribution.

Adjoining the store room and separated by a heavy fire wall is located the blacksmith and machine shop, where all ordinary repairs can be handled promptly. It will be fitted throughout with modern machine tools.

Three tracks run into the mill, which assure good shipping facilities. They connect with the Buffalo Creek Railroad, which is the belt line of Buffalo and gives the plant direct connection with all trunk lines entering into Buffalo. This is a great asset to a plant of this kind enabling it to get a good supply of cars and distribution throughout all eastern and western New York, as well as Pennsylvania.

The mill will be under the management of a good practical Superintendent, and the District Sales Department will have its headquarters in the large new office at the mill, and both departments will be in close touch with the main office of the company at Cleveland.

In the previous issue of Rock Products, figures were given showing that the total tonnage of the ground limestone at the Marblehead, the Dover Plains and the Buffalo plants of the Kelley company are 1,250 tons per day or 273,000 tons per year, based on 300 working days per year; while in all 13 plants of the company the total capacity of calcined lump lime is 2,350 tons per day, or 700,000 tons per year.

Who's Who and Why

LOCUST GROVE, VIRGINIA, is the most important geographical point in the United States and therefore in the world to H. G. Shirley, Secretary of the Highway Industries Association; this despite the fact that he is engaged in most important work in a most important center, the capital place of the country, Washington, D. C. But the reason is plain; it was at Locust Grove that Mr. Shirley began life.

Later he attended private schools and graduated in due time from the Virginia Military Institute at Lexington, from which he received a degree of civil engineering. The Maryland Agricultural and Mechanical College also conferred upon him the degrees of Doctor of Science.

He was connected with the engineering department of the New York Central Railway, and with the district engineering department of the District of Columbia; was Commandant of cadets and Professor of Military Science and Mathematics in the Horner School; Assistant Engineer in the West Virginia Central Coal & Iron Extension; Assistant Engineer B. & O. Railroad; Road Engineer of Baltimore County, Md. for eight years and for six years Chief Engineer of the Maryland State Roads Commission.

Henry G. Shirley

Wisconsin and Illinois Crushed Stone Men Combine

R. W. Scherer of Wisconsin to Direct Publicity

PRESIDENT A. J. Sullivan of the Illinois Crushed Stone Association, realizing the increased need for concerted action on the part of crushed stone producers at this time, has adopted a program of enlarged activities for his organization. At the suggestion of President A. J. Blair of the National Crushed Stone Association a plan has been formed to conduct a publicity campaign in connection with the Wisconsin Crushed Stone Association. This co-operation will greatly reduce the expense of an educational campaign to both states, besides making it more effective.

A meeting of the Chicago producers was held recently. The plan receiving the unqualified approval of all the producers in the city, it was determined to extend membership to all commercial plants in the state, that is, to all railroad shippers. R. W. Scherer, the Secretary of the Wisconsin Crushed Stone Association, whose work along this line in Wisconsin is well known, will have charge of the publicity bureau and was delegated to solicit the co-operation of quarrymen throughout the state. At this Mr. Scherer has been very successful; at St. Louis a meeting of the producers was held who extended their hearty endorsement to the plan. Most of the large producers in the state have been interviewed and have consented to join the movement, in fact, it is hoped that 100 per cent of the quarrymen will support the Association.

There never was a time when the urgent need for organization in the industry was more felt. Membership in the Illinois Association includes membership in the National Association, and the Illinois producers will be represented at Washington through the National Secretary, A. P. Sandles, who is abundantly able to look after the interests of the industry in the many questions that are constantly coming up in the National capitol for immediate decision.

There never was a time when it was more necessary to make known the merits of crushed stone than just now. No producers or very few of them are urging the merits of their product in a systematic way. It must be done by co-operation, by each one contributing his share and inducing his competitor in the business to do the same. And crushed stone has merits and they can be made known.

We must look to the future; to bake bread tomorrow, you must set the yeast today. To educate road builders and engineers to the extended use of crushed stone, the campaign must begin at once and the Illinois producers are putting themselves in line to reap the benefit of increased road work that is surely coming sooner or later. Particularly in the crushed stone business are co-operation and publicity essential. Little is done by individuals; each one tries to fill the orders that are offered, but none makes efforts to create new business. It needs only to cite the splendid example of the Portland Cement Association to show what publicity and co-operation will do; it is creating business for its members and that can be done for the crushed-stone industry.

In some lines of manufacture every sales man to some extent creates new business. For instance, in automobiles; a large percentage of sales is to people who have never used a machine. Not so in the crushed stone business. Individual operators and salesmen are rarely creating new business—trying to induce people to use their produce who have not used it before or trying to make them prefer it. Creating new business remains to be done by other agencies and there is no better way than by an educational campaign conducted at mutual expense.

That the demand for crushed stone can be stimulated and increased is not to be doubted. In spite of the fact that its use for this purpose is prohibited by engineers in many localities, crushed stone is an excellent material for concrete paving as can be demonstrated. To make known this fact, for it is a fact, and can be made known will bring tangible results to the industry.

Macadam, it must be conceded whatever our prejudices may be on the subject, has a large place in any paving program. There is probably a distinct preference in these days for road surfaces that require little or no maintenance even when conditions do not warrant the greater cost of such surfaces, when the interest on this greater cost would be ample to maintain macadam perfectly. It will be of immeasurable benefit to the good roads movement to see that maintained macadam gets due recognition. Advocating macadam in its proper place and urging its maintenance will bring substantial results to producers.

Secretaries of Builders' Supply Associations Meet

Discuss Problems of War-Time Dealer

EXECUTIVE OFFICERS of Building Material Associations of the country met at the Hotel Sherman, Chicago, on Thursday, May 23rd, at 10 o'clock. This was the second quarterly conference of Secretaries and Managers, the first being held at the time of the National Builders' Supply Association Convention last February. Geo. A. Olsen, executive secretary of the Chicago Building Material Exchange, was instrumental in calling the organization men together, and acted as chairman of the meeting.

The visiting secretaries were guests of Chicagoans at the noon luncheon and the evening dinner. At the conclusion of the dinner, a theatre party was given by the visiting secretaries in honor of the local secretary, Mr. Olsen, who called the meeting and made the arrangements necessary for its success.

R. H. Hildebrand, secretary of the Indiana Builders' Supply Association, spoke on "Trade Differentials," calling attention to the fact that present differentials allowed dealers are not sufficient in many instances to permit carrying charges, overhead expenses, and other incidentals in connection with the handling of carload business.

Sales of Concrete Materials on Tonnage Basis

Ralph P. Stoddard, secretary of the Ohio Builders' Supply Association, led a discussion on "Tonnage vs. Yardage Basis in Selling Concrete Materials," in which he stated that the tonnage basis was the only fair and logical manner in which the sale of sand, gravel and stone should be made. The materials are bought by the ton from the producer and should be sold by the ton to the contractor and the consuming trade; that the yard basis was at the best a guess and where a correct yard was measured it was sold by weight any way and thereby put on the weight basis which is more easily figured in tons than on the odd figures allowed for yards.

J. W. Potter, manager of the Material Dealers' Credit Association of Indianapolis, and J. C. Post, secretary of the Milwaukee Building Material Exchange, talked on "The Advisability of Associating Building Material Credit Bureaus with Exchanges." Each argued that the work of one was so closely allied to the work of the other that in his opinion the two could be associated to advantage. In both Milwaukee and Indianapolis the exchange work is done in connection with credit bureaus.

Ralph M. Lucas, secretary of the Columbus Building Material Exchange and attorney for the Ohio Builders' Supply Association, gave an interesting talk on "Lien Laws," in which he referred to the valuable features of the lien laws in some states and the slight protection given by the laws of other states. He emphasized the point that lien laws should never be taken into consideration in judging a man's credit. He is not entitled to extra credit because of lien laws. They are merely a protection against an absolute loss caused by a large credit risk. When the dealer is compelled to file a lien for the collection of money, he must figure that all chance of profit on the sale involved is lost. Therefore, a lien law does not enhance the credit risk of a contractor.

Thomas E. Wright, secretary of the New York Builders' Supply Association, led a discussion on two topics: "Curb Delivery" and "The Empty Bag." He emphasized the necessity of delivering materials at the curb in order to stave off heavy losses caused by delivering on temporary roads and soft ground. On the bag question he stated that the cost of handling empty sacks should not be overlooked. Mr. Wright has the distinction of having made the greatest sacrifice in attending the meeting and traveling the greatest distance in order to do so. His headquarters are in Rochester, N. Y. Due to the large territory he covers in the entire state of New York, he has had a large experience from which he drew timely illustrations in his arguments for both curb delivery and a just and equitable charge in handling empty sacks.

Charles T. Harris, secretary of the National Builders' Supply Association, spoke in behalf of the National organization and emphasized the fact that the N. B. S. A. is co-operating with other organizations in forming a federation of building industry. He reported the activity of the American Institute of Architects in calling a conference in New York, on June 14th of organizations affiliated with the building industries and called attention to the necessity of the building material men of the nation to co-operate in the movement. He also spoke of the plans of the N. B. S. A. for enlarging its field of work in states where at present association work is not allied with the N. B. S. A. His arguments on the Federation of the Building Industry were augmented by the chairman, who read letters from Mr. F. T. Miller, president of the F. W. Dodge Co., New York, and instigator of the Federation movement, and from Thomas R. Kimball, president of the American Institute of Architects.

The secretaries decided to hold their next meeting at Cleveland on Thursday, August 15th, and in accordance with the plan adopted the chairman appointed Ralph P. Stoddard to succeed him as chairman of the conference.

The secretaries have no formal organization, no constitution or by-laws, keep no minutes and pass no resolutions. Their only officer is a chairman who acts for the secretaries between meetings and who is chairman of one meeting at the close of his three-months' term of office

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New Structural Slate Company

THE Structural Slate Co., a Pennsylvania corporation just organized, with a capital stock of $100,000, located at Pen Arygle, Pa., began business April 15. The products they will handle are manufactured by twenty different mills, seven of which are located in the Bangor region, five in the Pen Arygle, five in the Wind Gap and three in the Slatington regions. Their combined capacities are 3,000,000 square feet of structural slate per annum, which enables the company to furnish facilities such as have never been known before in the structural slate business. The purposes of the Structural Slate Co.'s organization are: (a) To standardize more effectively the manufacture of the goods, with a view to giving a superior grade of workmanship; (b) To standardize the plumbing fixture business so that the goods of plumbing supply houses shall carry fixtures of uniform sizes, of which the Structural Slate Co. will carry large quantities in stock, thus providing prompt shipments of complete fixtures without vexations, delays heretofore encountered; (c) To place the distribution of structural slate on a more stable basis, thus making it a profitable line for the various kinds of business to whom slate is marketed; (d) To enable the mills to operate at a reasonable profit by doing away with the ruinous competition for business that has existed heretofore; (e) To advertise the goods, investigate new markets, and in a general way enlarge the use of the material; (f) To facilitate the handling of large business, or business requiring quick deliveries, by the distribution of such business among the concerns best fitted to handle it expeditiously, thereby giving quick service and prompt deliveries. The officers of this organization are: President, N. M. Male; vice-president, William Bray; treasurer, William H. Smith; secretary, B. W. Ribble; general manager, W. A. Kitto. Directors, William Bray, Thomas Bolger, C. C. Wise, William H. Smith, B. W. Ribble, N. M. Male, M. L. Parsons, Alfred Doney, Henry Stoddan, Toney Spry, Clarence W. Masters, M. L. Finsman, George Reasly, D. B. Heller, John Bachman and John R. Edwards.

Government Beginning to See Necessity of Private Building Operations

Housing Problem So Acute in Many Instances That Officials Begin to Regret Measures for Discouraging Private Building Construction

NEW YORK—With New York 200,000 apartments short of present requirements and vast munition and other war industrial plants bringing in more workers every week Senator William M. Calder has succeeded in winning new hope for builders the entire country over, not only from the Treasury Department, but from William P. G. Harding, Governor of the Federal Reserve Board, to the end of determining the "steps that should be taken to make private building operations possible," according to The Dow Service Daily Building Reports.

Private building construction throughout the country normally totals a billion and a half dollars a year. The year 1918 will not develop more than $300,000,000. This has been due to the belief of banking and mortgage lending institutions that it is the wish of the Treasury Department that no loans be made on private building work.

Secretary Explains Attitude

After ascertaining that the conditions regarding available housing, storage facilities and industrial space existing in New York are proportionately existent in many other parts of the country, Senator Calder took the matter up officially at Washington with the result that Secretary McAdoo assured him that any hesitancy on the part of banks and mortgage companies to make loans on projected building operations or improvements has not been due to advice from the Treasury Department against making such loans. On the contrary the Treasury Department went on official record advising these banking and mortgage interests that "the attitude of the Treasury Department has been that capital which is needed during the period of the war should not be employed in the construction of unnecessary buildings at this time. But there has never been any suggestion that buildings actually needed for the health and protection of the civil population or for the conduct of essential business of the country should not be constructed during the period of the war . . . .

When Work Should be Done

"Where it is a question of need—be it on account of sanitary conditions or because without such new construction other operations essential at this time for the welfare of the country would suffer—there is no doubt that the work should be undertaken. This applies equally to construction work in cities, towns and in farming districts." The foregoing is an extract from an official letter to Senator Calder signed by Secretary McAdoo.

Equal assurances have been given to Senator Calder by Bernard M. Baruch, Director of the War Industries Board that it was not the intention of his board to issue any order, stopping private building work.

Writes to Mr. Harding

He then addressed a communication to William G. Harding, Governor of the Federal Reserve Board, stating that "the Government has taken up the matter of meeting the shortage in housing facilities as it applies directly to people employed directly on Government work, but unless some further relief comes we will face a serious situation next spring. For that reason I would be glad if the Federal Reserve Board and the War Finance Corporation will take under advisement the question of whether it would not be best to encourage the construction of some new buildings, particularly homes. . . . . The situation would change if there was some encouragement from the Federal Reserve Board and the War Finance Corporation."

Harding Ready to Take Up Matter

Mr. Harding's reply was that he was ready to take up this matter at any time and suggested that the new Capital Issues Committee be apprised of the very critical trend of affairs in the national building situation as soon as it meets.

The relation between the shortage of housing and other necessary war time space and the supply of materials and labor with which to construct these buildings is very close. Investigations made by The Dow Service Daily Building Reports as to conditions of supply of materials available for both Government and private building

Curtailment of Construction

Why Is the Essential and Non-Essential Policy Applied to the Building Industry Alone?

GOVERNMENTAL burdens have been impartially distributed upon all industries, and the building industry is particularly unfortunate in having applied to it alone, without a clear definition, the essential and non-essential policy. And until this is either more clearly defined or changed to the general policy of priority the industry must continue to place the most constructive interpretation possible on the statements of the Secretary of the Treasury, even though it may not understand why further efforts should be made to free its labor while its labor is already in idleness, or to free its materials while many of its materials are not being used, as well as why many of the non-essential and luxury producing industries are allowed the use of capital, labor and materials, unhampered by publicity and direct interference.

Construction Creates Wealth

In exchanging the ownership of funds, construction frees and gives earning power to capital otherwise locked up in land, while not exhausting but creating capital out of natural resources and raw materials, the majority of which are not essential for Government use. Buildings are one of the most permanent forms of wealth, a means of producing more wealth and one of the most secure bases of increased credit. The withholding of funds from circulation through this industry tends to decrease rather than increase national wealth.

Money saved by curtailing the consumption of food, clothing or luxuries is added to the national wealth, but the curtailing of building does not add to the national wealth; it is a deferred charge, part of our war debt, to be paid after the war is over at an increased cost, probably by a disorganized industry.

Curtailment Not a Saving

The curtailment of building is not a saving but an expense during the war, because through lack of normal facilities the cost of everything is increased, since buildings are primary tools of industry, necessary for the production of all other tools of industry as well as for the production of the necessities of life, food, clothing and shelter.

If in an endeavor to free labor, materials and capital for future Governmental use we are holding in idleness labor which we are unable to assimilate we are confronted with the economic law of Diminishing Returns.—From an address by F. T. Miller, president of the F. W. Dodge Co., New York City.

prove conclusively that once the lending institutions let down the bars on the demand that has been straining at the leash for expression ever since the country went into the war the building material manufacturers would bring their resources into play to see that neither the Government or private building interests suffered from lack of materials. The fact is very clear that the minute some form of official encouragement can be issued direct to builders and money lenders that necessary private building construction can proceed to its full part in contributing toward winning the war, just so soon will the manufacturers of building materials bend their backs to the work of turning out the necessary commodities.

Manufacturers believe that the fuel shortage at building material manufacturing zones is due to the same feeling pervading those having charge of distribution that building construction is not an essential factor in winning the war. Therefore, fuel is not freely forthcoming, thereby making for very low reserves next spring when the real crisis of shortage of building will come unless immediate relief is afforded.

No Reserve Stocks on Hand

The building material manufacturing season averages not more than one-third of a year and the present season is almost half gone with no reserve stocks on hand in any industry save that of brick. This condition is almost alone responsible for the constantly increasing price of building materials. With no reserves on hand, and demand constantly increasing, but retarded because of hesitancy on the part of bankers and mortgage houses, and labor increasingly hard to get, building material prices are bound to advance and stay high long after the era of war-time prosperity passes.

The time to meet the building demand is before the law of supply and demand reaches the point of separation, that stage which is fast developing when demand is keen, but building material prices and construction costs are actually prohibitive.

The sooner the word of encouragement can come from Washington to building interests to proceed with necessary private construction work the better it will be.

U. S. Rail Administration Is in Three Parts

WASHINGTON, D. C.—In his report to the United States Chamber of Commerce at its Sixth Annual Meeting, Harry A. Wheeler, Chairman of the Railroad Committee, presented an analysis of the organization which will be responsible for this country's 188 large railroad systems and about 800 short lines.

Roughly speaking, the Railroad Administration is divided into three parts, the Regional Administration, the Central Administration and the Advisory Division.

Three Operating Territories

Three Regional Directors, responsible for the entire operating situation in their respective territories, have been appointed for the Eastern, the Southern and the Western railroads respectively. Responsible to them are the executives of the various roads; and through a Conference Committee of officers in each district a clearing house of mutual assistance and interest has been developed.

Head for Each Department

The Central Administration includes six important Divisions each in charge of a Director.

The Director of the Division of Capital Expenditures receives and passes upon the reports made by the railroads as to their budgets of necessary expenditures for improvements; and has supervision over capital expenditures.

The Director of the Division of Public Service and Accounts has charge of questions raised by any portion of the public as to the adequacy of the service and represents the interests of the farmers, manufacturers, producers and consumers generally.

The Director of the Division of Labor deals with problems of wages, conditions and labor.

The Director of the Division of Transportation has general supervision of all matters affecting operation.

The Director of the Division of Traffic deals with the classification of traffic, the determination of charges and the settlement of claims made by passengers and shippers.

The Director of the Division of Finance and Purchases is responsible for the coordination and supervision of railroad purchases and the development of plans for meeting the financial requirements.

Committees Cover Whole Field

The third, the Advisory Division, is composed of committees giving their respective attention to the questions of railroad extension, railroad wages, labor possibilities of inland waterways and fuel.

Lime Manufacturers' Convention at Cleveland, June 19-20

THE twice postponed convention of the National Lime Manufacturers' Association will be held at the Hotel Statler, Cleveland, Ohio, Wednesday and Thursday, June 19 and 20. The reorganization committee will report on a new scheme of handling all the work of the association through a single executive. The plan proposed is very similar to that on which the Portland Cement Association is formed. Definite action will be taken on this report.

The technical session will be brief. A day will be devoted to an excursion to the Marblehead plant of the Kelley Island Lime & Transport Co. There will be an election of officers and a discussion of many important business matters. A large attendance is expected. The newly organized association will probably start with a membership representing at least 80 per cent of American lime production.

Supreme Court Decides Rate for Cement Co.

LOUISVILLE, Ky.—The Supreme Court of the United States on April 29, rendered a decision favoring the Louisville Cement Co., operated by the J. B. Speed interests, in a rate case against the Interstate Commerce Commission, in which the high court reversed the Commerce Commission, alleging that the latter had no jurisdiction in the case, and remanding the case for further consideration.

A principle is involved in the case that is of much interest to shippers generally.

The case dates back to July, 1906, when the L. & N. R. R. printed a new tariff on coal from North Jellico and Wilton, Ky., Speed mines, to the Louisville Cement Co., at Speeds, Ind. Through error the printer made the rate $1.10 instead of $1. The coal through mistake continued to be billed at $1. The railway company upon finding the error forced the shipper to pay the additional ten cents on each ton that had been billed, this amounting to more than $2,000, and corrected the tariff for the future. The cement company filed complaint and asked for reparation. The railroad admitted the facts, and stated that it should be allowed to refund the overcharge.

The Interstate Commerce Commission following a former ruling held that under the two-year statute of limitation, the case was barred from its consideration, as the overcharge had been made several years prior. The cement company then filed mandamus proceedings against the Interstate Commerce Commission. The decision of the Supreme Court reverses the lower courts as well as the Interstate Commission, and is one of the first big victories that has been won against the commission.

Thousands Saved by Decision

Many thousands of dollars throughout the country are depending on this decision for recovery, because in many instances the change in the rate was not discovered until after the shipper would be barred from recovery.

Council of National Defense an Agency To Help Road Improvement

Local Authorities Could Obtain Valuable Assistance in Urging Road Improvement by Working in Co-operation with the State Councils of Defense

TO INAUGURATE the system of state councils of defense, a conference of the states was called by the Council of National Defense in the early days of the war and held in Washington on May 2, 1917. It was attended by many governors and leading citizens of the states, appointed by their commonwealths. The State Councils Section of the Council of National Defense had previously been established on the day that war was declared by America, April 6, 1917.

The result of this history-making conference, which was addressed by the President and several members of the Cabinet, was to get rapidly under way the unification of the state defense activities of the nation. In the period immediately after the conference the National Council addressed itself to developing the organization of state councils of defense, with the result that in every state a council has been created as the official war emergency organization of that state.

Created to Meet Local War Problems

For more than a year, therefore, the Council of National Defense has been constantly guiding the growth and work of the now great system of state councils, to the end of making their aid effectively available to the Government, to afford to each state council the benefit of the experience of the others, to encourage each state council to undertake, where desirable, spontaneous activities to meet the war needs of its state, and to act as a fluid and flexible communicating agency between the Federal departments and war administrations on the one hand, and the state councils of defense themselves on the other.

At all times the Council of National Defense has recommended that the various state councils of defense should be constituted statutory bodies and should have specific financial appropriations. To date twenty-three state councils have been established by statute. Twenty-six councils have definite appropriations, the amounts varying from $1,500 to $5,000,000. Most of the other state councils have obtained funds for their work from available state funds or private subscriptions.

The Council of National Defense has worked for the creation by state councils of smaller subordinate councils. It has sent out various bulletins outlining such organization with the result that forty-six state councils have organized county or township councils of defense, and forty-six states have adopted the program for the organization of community or similar subcounty councils. In the organization of community councils coöperation has been given by the Department of Agriculture, American Red Cross, Committee on Public Information, Bureau of Education and Commission on Training Camp Activities.

By resolution of the Council of National Defense, all Federal agencies have been requested to communicate with the state councils only after presentation of their plans to the Council of National Defense and through the State Councils Section.

To Stimulate Food Production and Transportation

The Council of National Defense works with the Agricultural Department along all general lines of food production, and many state councils have established close connections with all state agents of the department. In almost every state a definite program is being worked out jointly by the state council and the state agricultural colleges and the agents of the Department of Agriculture. Again, eight different bulletins have been sent out on the subject of food conservation, and the aims and work of the Food Administration. In addition to general campaigns to stimulate production and conservation, the state councils have dealt with the following forms of food activity.

Anti-hoarding, fertilizer, extermination of pests and diseases, financial aid to farmers, farm labor, gardens, hotel and restaurant economy, household economy, farm implements, increase in acreage, markets, price regulation, livestock, seeds, surveys and preserving, **food transportation.**

The National Council has sent out numerous bulletins asking the state councils to undertake work for the Highways Transport Committee of the Council of National Defense in motor truck transportation and the establishment of return load bureaus.

The state councils are rapidly developing a method which provides for the coördination of all federal agencies in the state, through the establishment of war boards, consisting of state council officials and the state agents of the various federal departments and war administrations. The Council's suggestion as to the creation of such boards has met with excellent response from thirty-five states.

Make Use of Local Councils

The paragraphs given above are an abstract of an official statement of the activities of the National Council of Defense. The idea which will probably occur to the minds of those who read them is, why not make these councils more useful, why not ask their more active coöperation to get somewhere on one of the most pressing of local and national war problems, FOOD TRANSPORTATION.

The experience of Great Britain in neglecting road maintenance and road improvement work should be convincing evidence to any local council of defense of the national importance of road work. By going into details on local needs they would soon find ample opportunity to do both their own communities and the National Government a great service by initiating constructive work to help carry out the road improvement program.

Why Not Use Prisoners?

Why not let necessary road improvement work be done upon the recommendation of the National Council of Defense and under some supervision by the local councils of defense. Under such supervision prisoners of war could be employed, or if this is undesirable, why not use the hosts of Federal military prisoners, draft evaders, I. W. W.'s and others who are eating at the expense of the public and giving and doing nothing in return?

There is ample opportunity for these Councils of National Defense to become more active factors for real national defense; for the bulwark of national defense is our agricultural wealth. To increase it, to make it available for our own population as well as for our Allies is the big problem of those who stay on this side of the Atlantic. That is the reason why we must keep our roads in decent repair and why we must put in decent condition those which are hardly passable.

High Cost of Poor Roads

POWER costs money to the farmer and to every one else who must draw loads over our roads. A scientific test recently proved that to draw a load over a concrete road in an ordinary farm wagon required a pull of 27.6 pounds per ton of gross load; over asphaltic oil and screenings with a concrete base, 49.2 pounds; good water-bound macadam, 64.3 pounds; good gravel roads, 78.2 pounds; dry dirt road, 92 pounds; dirt with mud on top but firm underneath, 218 pounds.

The difference in power required between good roads and poor is power wasted. The loss is borne not alone by the transport owner but by all consumers.

Car Supply for Stone and Gravel

Can Use Cars Not Absolutely Required for Coal, Coke and Ore—Maintenance First

THE following rules are promulgated by the Car Service Section of the Federal Railway Administration for the guidance of all carriers in distributing open-top equipment:

1. Open-top cars, suitable for such traffic, should be furnished preferentially for the transportation of coal, coke and ore.

2. Available open-top cars, not suitable for the transportation of coal, coke or ore, may be furnished for the transportation of stone, sand and gravel, and when so furnished shall be used preferentially for highway maintenance materials.

3. Open-top cars, suitable for the transportation of coal, coke and ore, and available on coal, coke or ore producing roads in excess of the demand of such commodities, may be furnished for the transportation of stone, sand and gravel, and when so furnished shall be used preferentially for highway maintenance materials. The return movement to mines or ovens should be utilized wherever practicable in furnishing car supply for stone, sand and gravel. Every endeavor should be made, consistent with keeping up the production of coal, coke and ore, to furnish shippers of stone, sand and gravel with a minimum of forty per cent of their normal weekly transportation requirements.

4. Roads which are not producers of coal, coke or ore must not use foreign open-top equipment for stone, sand or gravel shipments, except for one load in the course of the return movement to mines or ovens.

5. Where the transportation needs of essential road construction or maintenance projects cannot be met by car supply furnished in accordance with the above rules, the State, County or Municipal officials in charge of the work should, through their proper state highway department, apply to the Director of the Bureau of Public Roads, United States Department of Agriculture, Washington, D. C., for assistance. Such applications will be considered by representatives of the Department of Agriculture, the War Department, the War Industries Board, the Fuel Administration and the Railroad Administration, and in accordance with the recommendations of such representatives the Car Service Section will endeavor to furnish car supply necessary for approved essential road construction or maintenance.

It must be understood that car supply for stone, sand and gravel must not be permitted to jeopardize the essential production of coal, coke or ore. If at any time such a result is apparent on individual roads, or generally, orders will immediately issue to curtail the car supply for stone, sand and gravel.

Factory and House Building Soon to Revive in Chicago

CHICAGO—The interpretation by builders of the orders of Secretary McAdoo relative to new construction work is being felt by the building material industry of Chicago. Figures of recent date show that there is more than a 50 per cent decrease in the valuation of present permits when compared with last year. Building material manufacturers and dealers continue optimistic, however, and believe that building operations will soon start on a more extensive scale. They point to the fact that practically every factory building in Chicago is occupied with operating concerns, thus causing a shortage of buildings for manufacturing purposes.

While there are some vacancies in apartment buildings in certain sections of the city, other districts, such as the west, northwest and far north sides, present very few vacancies. Thousands of families change their abiding places at this time of the year, and heads of these households are finding it no easy task to find suitable vacancies. It is in these sections especially that retailers of buildings materials look for early construction work.

Family hotels are also crowded and there is much talk among architects concerning this situation. They report that numerous plans are being drawn for this class of building.

While the demand for materials for other classes of structures is not very brisk, the Board of Education has already commenced active operations on 41 school buildings to be erected in various sections of the city.

Building material prices remain unchanged.

How to Get and Hold Labor

Even Uncle Sam Has Found That High Wages Are Not of Themselves a Sufficient Inducement

ONE OF THE BIG PROBLEMS of the day is how to get labor and having got it, how to keep it. No employers are suffering more from labor shortage than the employers of unskilled labor such as operators of crushed-stone and gravel plants, contractors and the like.

The sad part of it is that this condition is likely to continue even when the war is over, so far as ordinary unskilled labor is concerned. Under such circumstances every employer of labor must give some attention to humanitarian considerations like housing, schooling, accident prevention and other things besides wages.

Even the United States Government, according to an official news bulletin of the Ordnance Bureau of the War Department, has found that it can not prevent frequent labor turnovers without recourse to elaborate social and community facilities. The program the Government is working on is as follows:

"Campaign of patriotic education to impress upon workers that they are the second line of defense and their efforts absolutely essential to the safety of the men in France and the winning of the war.

"Formation of housing companies and of building and loan associations and the encouragement of home-building by individuals.

"Extension of trolley tracks to new districts and increased service.

"Extension of water, sewer, gas and electric service to the new housing districts.

"Ordinances to prevent the exploitation of the workers.

"Encouragement of growing of produce by near-by farmers, and installation of public markets for producer and consumer.

"Provision of facilities for plowing and harrowing home gardens.

"Installation of branch libraries for convenient use of new workers and their families.

"Erection of community center 'huts' with moving pictures, supervised dances, concerts, lectures, etc.

"Increased school facilities for children of new workers, and night school during winter months for adults.

"Control of alcohol and social evils, and education of workers by medical specialists.

"Complete Americanization movement for naturalization of aliens, and instruction in history and citizenship.

"Education of workers, their families and especially the children to the need for thrift, and the complete utilization of the workers' time."

Workers Coming to Oakland Makes Bungalow Demand

OAKLAND, Cal.—Many families are coming to Oakland owing to the demand for workmen in the ship building yards. In consequence the construction of bungalows have increased; this constitutes about the only building work now going on excepting for ship building.

Government Order Withdraws Cars from Road Work in Louisiana

Specific Example of Lack of Co-operation and Understanding by Different Government Bureaus

AFTER HAVING MET serious obstacles to continuing its road improvement program, and having conquered them with the necessary approval by the Federal Government authorities, Quachita Parish, La., is again threatened with the necessity of suspending all new construction, according to advices received from there last week.

The immediate source of trouble is a Government order directing the Missouri Pacific Ry. to withdraw all cars being used in gravel service and to put such cars in the coal service.

Been Using 100 Cars

Gravel for the two districts is being secured from the Louisiana Sand, Gravel and Construction Co., two miles west of West Monroe, on the V. S. & P. Ry. To transport this material about 70 Missouri Pacific cars and 30 V. S. & P. cars have been used. The V. S. & P., it is said, can furnish no more cars for the service. If the new order is upheld, therefore, Quachita road construction virtually will be at an end.

The order is evidently being used by the Missouri Pacific officials to get back the 70 cars which the parish road officials have been using on the V. S. & P. under the theory that with Government control the cars could be used on any line. They are willing to use them for gravel or lime on their own lines.

Difficulties Explained in Letter

A letter sent by the Monroe, La., Chamber of Commerce to Congressmen R. J. Wilson at Washington makes clear that the various Washington departments are not pulling together for whole-hearted road improvement. The letter reads:

"I have just seen a letter written to you by C. H. McHenry, president Road District No. 1, regarding the action of the Missouri Pacific in withdrawing from gravel service the cars which were being used to haul gravel for road work in Ouachita parish, and in behalf of the Monroe Chamber of Commerce I wish to join in his request to you to bring the matter before the proper authorities in the railroad administration to secure relief, so that our road work in this parish may proceed.

Need Co-operation

"The government, and especially the railroad administration are urging the necessity of highway transportation, and Ouachita parish is doing its best to make the same possible in this territory by completing a system of gravel roads. However, without some co-operation from the railroad administration in allowing cars for hauling gravel, the work cannot proceed.

"The main part of our project is a direct highway through Ouachita parish, which will be an important link in the highway from Camp Pike to Camp Beauregard, an especially urgent matter just at this time both from an economic and military standpoint."

Oil and Coal Products in Road Work Limited

Fuel Administration and Office of Public Roads to Pass on Applications for Bituminous Products to Be Used in Construction and Maintenance

WASHINGTON D. C.—Petroleum, asphalt, or tar products wanted for the construction, maintenance, or reconstruction of roads will be delivered only after approval of the application by a committee representing the United States Fuel Administration and the Office of Public Roads of the United States Department of Agriculture. This announcement was made by officials of the two Federal agencies.

Page to Consider Applications

State highway departments, to which notices of the restrictions have been sent, are required to pass upon all applications for highway work in their territories involving the use of these materials. Applications are then to be sent to L. W. Page, Director of the Office of Public Roads, Washington, D. C. Mr. Page is chairman of the committee which will consider the necessity of the material being supplied and will make recommendations to the oil division of the Fuel Administration, which will issue permits in accordance with the recommendation when the material is available.

Bituminous Roads Worth $1,000,000,000

Upwards of a billion dollars is the valuation placed by officials of the Office of Public Roads upon bituminous macadam roads in this country requiring for their maintenance asphalt, road binders, road oils, tar binders, or dressings. The plan to issue permits is designed to prevent further deterioration of these roads, and at the same time endeavor to satisfy fully the fuel oil requirements of the Army and Navy, the essential war industries, and the Allies.

Big Demand for Fuel Oil

The United States is now being drawn upon to a constantly increasing extent for petroleum products, especially fuel oil, according to officials in the Oil Division of the Fuel Administration. The supply of bituminous products is so limited that it is requested that all new road construction involving these materials be deferred this year, except in cases where such work is necessary toward the winning of the war. Preference will be given to materials wanted for maintenance and repair work.

German Prisoners to Work Georgia Roads

GERMAN prisoners of war are to be employed on road work in the State of Georgia during the coming season, according to an announcement recently made at the War Department. The prisoners are sailors who were confined at Fort McPherson when the United States entered the war a year ago. They will receive pay from the state, part of which will be taken by the United States to pay the expense of feeding and guarding them.

It is also stated that plans are under consideration by the War Department, looking toward using enemy aliens interned at Fort Oglethorpe, Ga. While international law prohibits any government from compelling enemy aliens to perform menial work except that from which they derive a direct benefit, many of the prisoners have asked for employment, and they may be used by the State of Georgia.

NEW MACHINERY AND EQUIPMENT

Skip Hoist as a Conveyor

A POSSIBLE SOLUTION of the stock-pile rehandling problem for small sand and gravel and crushed stone plants lies in the use of a properly designed skip hoist installation. The R. H. Beaumont Co., Philadelphia, Pa., which has specialized hitherto in ashes, coal and coke handling systems, now places on the market a skip hoist design which has proved to be applicable to crushed stone and gravel handling.

The skip hoist consists of a bucket running on inclined or vertical tracks and hoisted by means of a steel cable attached to an electric drum. The bucket consists merely of a rectangular steel box open at the top and fitted with guide rollers and hoist bale.

The hoist drum is usually driven by an electric motor. The bucket is started upward by a pull on the starting rope or pushing a button. It discharges and returns automatically to pit, where it stops. In some cases the skip reciprocates continually and is automatically filled.

It can be used with a small push or electric car to move material a short distance to the loading hopper, or could be used in conjunction with a drag-line bucket or other mechanical device.

It is claimed that a 35-cu.-ft. trolley hopper car on 130-ft. haul, traveling 400 ft. per min., can make a round trip (260 ft.) in two minutes, including filling and dumping, assuming that material will flow by gravity into car. This equals 20 tons per hour for the extreme haul, or 40 tons per hour for average haul. A skip, consisting of two buckets, one going up while the other is coming down, can make a trip in 90 sec., including filling and dumping. If buckets are 35-cu. ft., capacity each, it would give 28 tons per hour at 50-cu. ft. per ton and 50-ft. lift. The 20-cu.-ft. single bucket skips, on a 50-ft. lift at 40 ft. per min., can handle 8 tons per hour. The 20-cu.-ft. skip requires a 6-hp. motor.

One man only is required. He fills the skip hopper and pulls the starting rope. If some simple drag-line device were operated from the same or a parallel drum hoist a single man could easily operate the whole device.

Electric Two-Drum Two-Speed Dragline Excavator Hoist

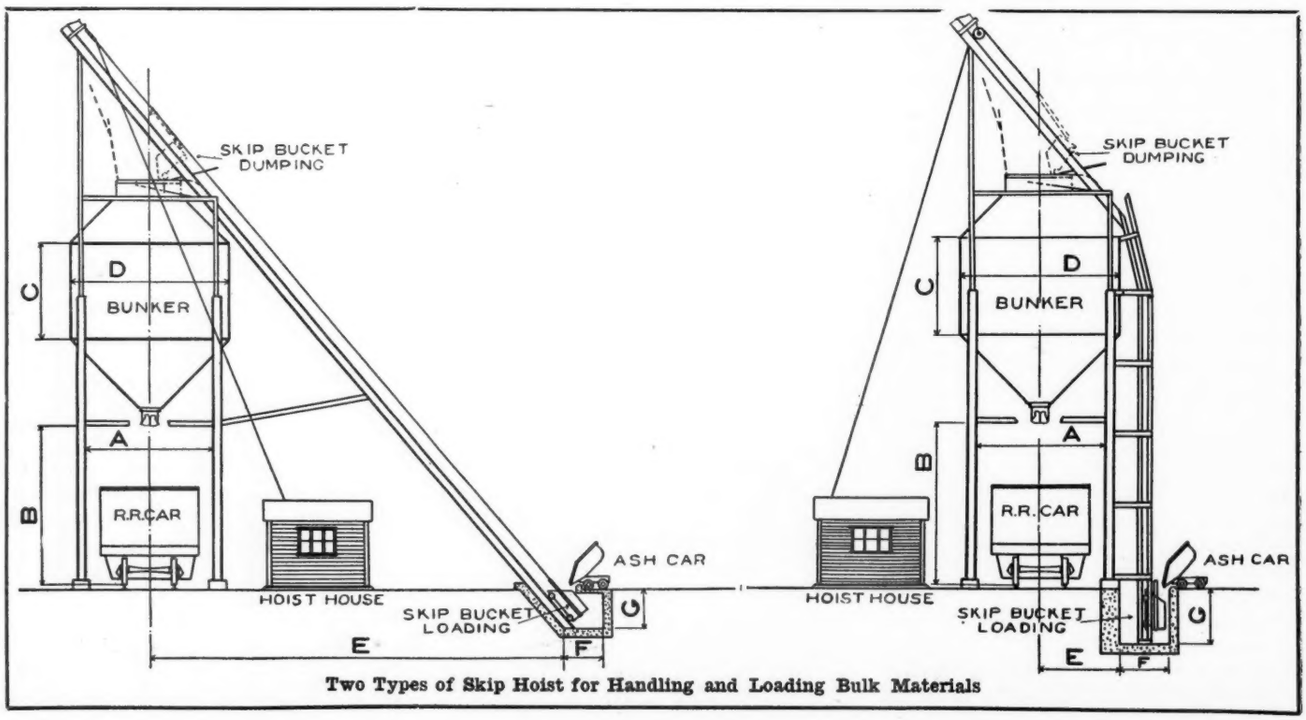
AN ELECTRIC HOIST has been developed especially for use in connection with slack line cableway drag bucket excavators by the Lidgerwood Manufacturing Co., New York City. This hoist is built for all sizes of buckets up to 2½ cu. yd. capacity. The two-speed feature is on the front drum only, the rear drum being a single-speed drum.

The object of having two speeds on the front drum is that this drum is used for loading the bucket at a reasonably slow speed suited to excavating, and for hauling it in on the track cable to the dumping point at a rapid speed. To obtain maximum capacity with this type of excavator the bucket must be conveyed from the digging point to the dumping point at high speed.

In order to obtain two speeds on the front drum two gear reductions are provided, one at each end of the drum, the drum having two specially designed, powerful friction clutches. By means of engaging one friction clutch with the slow speed reduction a duty on the drum is obtained sufficient for loading the bucket at a speed of 200 ft. per minute.

After the bucket is loaded this slow speed clutch is disengaged and the friction clutch at the opposite end of the drum is thrown into engagement with the high speed gear ratio and a duty on the drum is obtained sufficient to haul in the loaded bucket at a speed of 600 ft. per minute. After the bucket has been dumped the front drum is thrown into the neutral position, at which point neither of the frictions are engaged and the drum revolves free on its shaft, permitting the bucket to return rapidly to the excavating point by gravity.

The rear drum of the hoist is used for tensioning the track cable and delivers a duty sufficient for this purpose at a speed of 200 ft. per minute.



Two Types of Skip Hoist for Handling and Loading Bulk Materials

The Rock Products Market

Cement Market Active in New York City

NEW YORK, N. Y.—The market for Portland cement is fairly active and while Government demands largely dominate the situation there is a continued activity from private building sources that is more gratifying to the manufacturers, says the Record and Guide.

The mammoth structure of reinforced concrete to be erected for the Quartermaster's Department in Brooklyn will require half a million barrels of Portland cement. Other Federal projects daily announced will tax capacity of the mills.

Current Wholesale Prices in New York

NEW YORK, N. Y.—Current wholesale prices prevailing on the Building Material Exchange and elsewhere in the Metropolitan district are reported by the Record and Guide as follows (allowance must be made for yard and store prices):

CRUSHED STONE (500 cu. yds. lots, f.o.b. alongside dock N. Y., wholesale):

Trap rock, 1½ in. (nominal)	$1.85@....
Trap rock, ¾ in. (nominal)	1.95@....
Crushed limestone, 1½ in.	1.50@1.60
Crushed limestone, ¾ in.	1.70@1.80
Bluestone flagging, per sq. ft.	.17@0.18
Bluestone curbing, 5x16	.40@....

CEMENT (wholesale, 1,000 bbls. lots and over, alongside dock, N. Y.):

Domestic Portland, spot	$2.59@....

Rebate on bags returned, 10c bag.

Rosendale Natural to dealers, wood or duck bags	$1.15@.....

Rebate on bags, returned, 10c bag.

Agricultural Limestone Wholesale at Plant, per Ton

Cambria, N. Y.	2.50@3.00
Danbury, Ohio—(100% thru 10 mesh and 60% thru 50 mesh) Analysis, 83.54% CaCo3; 14.92% MgCo3—in paper, $4.50; in bulk	$3.00
Gary, Ind.—Fine F.F. screenings, below ⅛ inch	.85
Irvington, Ky.—(90% thru 100 mesh)	1.75
Ladds, Ga.—(100% thru 10 mesh linear)	1.50@2.00
Lewisburg, Ohio—(90% thru 100 mesh) Analysis, 96.02% CaCo3; 1.06% MgCo3; bags, $3.50; bulk	2.00
Lime Kiln, Md. (50% thru 50 mesh) Analysis, 96.80% CaCo3; trace MgCo3; bags, $6.50; bulk	4.50
Milltown, Ind. (30 to 50% thru 50 mesh) Analysis, 98% CaCo3	1.50
Muskegon, Mich.—(50% thru 50 mesh) Analysis, CaCo3, 53.35%; MgCo3, .4327%	1.60@2.00
St. Louis, Mo.	$1.70
Stone City, Ia.—(50% thru 100 mesh)	.50
Stephensburg, Ky.	1.50
Stolle, Ill. (near East St. Louis on I. C. R. R.)—(Thru ⅛" mesh) Analysis, CaCo3, 89.61 to 89.91%; MgCo3, 3.82%	1.50
Walford, Pa.—(70% thru 100 mesh; 84% thru 50 mesh; 100% thru 10 mesh); paper, $4.50; bulk	3.00
Whitehill, Ill.—(50% thru 50 mesh) Analysis, CaCo3, 98.98%; MgCo3, .54%	1.50
Winnfield, La.—(90% thru 100 mesh)	3.00

Wholesale Prices of Crushed Stone

Prices given are per ton, F. O. B., at producing plant or nearest shipping point

Crushed Limestone

City or shipping point	Screenings, ¼ inch down	½ inch and less	¾ inch and less	1½ inch and less	2½ inch and less	3 inch and larger
EASTERN:						
Auburn, N. Y.	.60	1.00	1.00	1.00	1.00	1.00
Burlington, Vt.	.....	.....	1.75	1.75	1.75	.....
Hagerstown, Md.	1.35	1.35	1.35	1.35	1.35	.....
Lime Kiln, Md. (hard stone)	1.50	2.10	2.00	1.75	1.50	1.35
North LeRoy and Akron, N. Y.		1.00 all sizes including R. R. ballast				
Syracuse, N. Y.	.60	1.00	1.00	1.00	1.00	1.00
Walford, Pa.	1.00	1.50	1.50	1.50	1.50	1.50
CENTRAL:						
Alden, Ia.	.20	.....	1.00	.90	.....	.....
Belvidere, Ill.		1.00 per ton, all sizes or quantity				
Brillion, Eden and Hamilton, Wis.	.80	.80	1.00	1.00	1.05	1.00
Chicago, Ill.		Carlots, all sizes, 1.40*. Wagon, 2.25*.				
Davenport, Iowa	1.00@1.15	1.25*	1.25*	1.15*@1.25*		
(Quarries near Davenport)	Dust .50	1.15@1.35	1.10@1.25	1.00@1.10	.95@1.00	.90@1.00
East St. Louis (vicinity)	1.50†	.90@1.10	1.00@1.10	1.00@1.10	1.00@1.10	1.00@1.10
Elmhurst, Ill.			1.00 cu. yd. all sizes.			
Gary, Ind.	.75	.75	.75	.75	.75	1.10§
Illinois, Southern	1.50	1.25	1.25	1.25	1.25	.....
Lannon, Wis.			1.00 all sizes.			
Lewisburg, Ohio	.60@ .75	.....	.90@1.10	.80@1.00	.80@1.00	.80@1.00
Mt. Pleasant, Iowa	1.50		1.10	1.10	1.00	
Oshkosh, Wis.			1.00 all sizes, Blue Limestone.			
River Rouge, Mich.	.60@1.00	.95@1.00	.95@1.00	.95@1.00	.95@1.00	.95@1.00
Stone City, Ia.	.50	.....	1.20	1.10	1.00	.....
Cleveland, Ohio		Avg. price, all sizes f.o.b. cars 1.70 net, ton				
Cincinnati, Ohio		Avg. price, all sizes f.o.b. cars 1.32 net, ton				
Columbus, Ohio		Avg. price, all sizes f.o.b. cars 1.22 net, ton				
Detroit, Mich.		Avg. price, all sizes f.o.b. cars 1.22 net, ton				
Ft. Wayne, Ind.		Avg. price, all sizes f.o.b. cars 1.27 net, ton				
Joplin, Webb City, Carthage Mo.				1.25@1.50	2.00	
Muncie, Ind.			.90 to 1.00 ton, all sizes			
Toledo, Ohio		Avg. price, all sizes f.o.b. cars 1.42 net, ton				
SOUTHERN:						
Brooksville, Fla.	1.00	.....	.....	2.00	.....	.....
El Paso, Texas	.95	.95	.95	.95	.95	
Fort Springs, W. Va.	1.00	1.00	1.25	1.25	1.00	.90‖*
Irvington, Ky.	.60	.....	.....	.75	.75	.75§
WESTERN:						
Kansas City, Mo.	.30	1.05	1.05	1.05	1.05	1.05
Blue Sprgs. & Wymore, Neb.	.15	1.25	1.25	1.15	1.10	1.00

Crushed Trap Rock

City or shipping point	Screenings, ¼ inch down	½ inch and less	¾ inch and less	1½ inch and less	2½ inch and less	3 inch and larger
Baltimore, Md.—Trap	1.00	2.00	1.90	1.75	1.75	1.50
Baltimore, Md. (vicinity)	.....	.....	2.50	2.00	1.75	.....
Bernardsville, N. J.	.....	2.40*	2.40*	2.00*@2.20*	2.00*	.....
Birdsboro, Pa.	1.25	1.75	1.50	1.25	1.25	1.25
Boston, Mass.	3.00	3.00	2.75	2.75	2.50	.....
	Boston prices for truck delivery on job					
Bradford, Conn.	.80	1.30	1.25	1.20	1.10	.....
Duluth, Minn.—Trap	.65@ .75	1.35	1.35	1.15@1.25	1.15@1.25	1.15@1.25
Farmington, Conn.	.....	.85	.....	.85	.85	.....
Glen Mills and Rock Hill, Pa.	1.05	1.35	1.55	1.55	1.60	1.30‖
Dresser Junction, Wis.	.50	1.25	1.25	1.00	.90	.....
Little Rock, Ark.	1.75	.....	1.75	1.50	1.35	1.10
New Haven, Conn. (vicinity)	.80	1.30	1.25	1.20	1.10	.....
Oakland, Calif.—Trap			1.50 for all sizes			
Philadelphia, Pa. (vicinity)	1.25	1.75	1.50	1.25	1.25	1.25

Miscellaneous Crushed Stone

City or shipping point	Screenings, ¼ inch down	½ inch and less	¾ inch and less	1½ inch and less	2½ inch and less	3 inch and larger
Atlanta, Ga.—Dolomite	2.35	2.15	2.05	1.95	1.85	1.85
Brooksville, Fla.—Flint	1.00	.....	.....	2.15	.....	.....
Ladds, Ga.—Dolomite	2.00	1.80	1.70	1.60	1.50	1.50
Little Falls, N. Y.—Syenite	.60	Other sizes 1.00, including R. R. ballast				
Hendlers, Pa.—Quartzite	.75	1.00	1.35	1.25	1.00	1.00‖
Boulder, Col.—Sandstone	.....	.....	.....	2.00*	.....	1.75*
Mt. Pleasant, Ia.—Basalt	.....	.....	.....	.....	.95	.85‡
Atlanta, Ga.—Granite	.35	1.75	1.60	1.50	1.50	1.45
Baltimore, Md.—Granite	1.00	2.00	1.90	1.75	1.75	1.50
Richmond, Va.—Granite	.80@1.00	1.25@2.00	1.25@1.50	1.25@1.50	1.25@1.50	1.25@1.50
Stephensburg, Ky.—Basalt			$1.00 for all sizes.			
Stockbridge, Ga.—Granite	.50	1.80	1.75	1.60	1.60	1.60
Winnfield, La.—Granite	.....	1.40	2.00	1.75	1.60	1.60
Millican, Brazos County, Tex. —Quartz sandstone	1.50	1.50	1.50	1.45	1.40	1.40

*Cubic yard. †Agri. lime. ‖R. R. ballast. §Flux. ‡Rip Rap.

Concrete Ships Enlarge Market for Producers

A CONSTANTLY growing market for the sand, gravel, crushed stone and cement producers is the yards of the concrete shipbuilding companies. These are steadily increasing in number, the Government having let numerous contracts for concrete ships of many sizes. At Wilmington, N. C., the Government is constructing a shipyard for concrete ships exclusively and it is expected the four ways will be completed in four or five weeks. The first boat will be launched in October.

Concrete shipbuilding, however, under Government contract and for private purposes is in progress on all the coasts of the United States. It is announced that the France & Canada Steamship Co. has purchased a site on Harbor Island, near Port Aransas, Texas, and will construct a large plant there. Its first work will be the construction of ten concrete oil barges, each 212 feet long, to be used in the Mexican oil trade. On this same island Otto P. Kroeger, a contractor of El Paso, will also construct a plant for building concrete ships, tugs, barges and smaller craft.

The Bureau of Construction and Repair of the Navy Department has awarded a contract to the Ambursen Construction Co. of New York for the construction of four reinforced concrete fuel oil and coal barges to be used in New York harbor.

Sand, Gravel and Potash Prices in New York

NEW YORK, N. Y.—Current wholesale prices prevailing in New York in the Metropolitan district and on the Exchange for sand and gravel are reported as follows (allowance must be made for yard and store prices):

SAND—
Screened and washed Cow Bay, 500 cu. yds. lots, wholesale.....$1.25@....
GRAVEL (500 cu. yd. lots f.o.b. alongside dock N. Y., wholesale):
1½ in. (nominal).....$2.00@....
¾ in. .....No quotation
Paving gravel .....No quotation
P. S. C. gravel.....No quotation
Paving stone .....No quotation

POTASH SALTS—
Muriate of potash—
80-85 p. c. basis 80 p. c., ton.....$3.35@....
Min. 90@95 p. c. basis 80 p. c., ton Nominal
Sulphate of potash—
Min. 90@95 p. c. basis 80 p. c., ton 3.35@....
Min. 90 p. c. basis, ton..... Nominal
Double manure salt—
48@53 p. c. basis 48 p. c., ton..... Nominal
2,000 pound lots net weight—
Manure, salt min. 20 p. c. actual potash, N. Y., ton..... Nominal

Miscellaneous Sands per Ton at Plant

Bowmanstown, Pa.—Fine white silica	$2.10
Dundee, Ohio—Glass sand	2.25@3.00
Morgantown, W. Va.—Glass sand	3.25
Warwick and Sugar Grove, Ohio—Glass sand	2.25@3.00
Zanesville and Layland, Ohio—Moulding, fine, $1.75; coarse	1.25
Sands, Elk Co., Pa.—Glass sand, $2.50@2.75; selected glass sand	3.00
Albany, N. Y.—Moulding, 2,000 lbs.	1.75@2.00
Allentown, Pa.—Moulding	1.25@1.40

Wholesale Prices of Sand and Gravel

Prices given are per ton, F. O. B., at producing plant or nearest shipping point

Washed Sand and Gravel

City or shipping point	Fine sand, 1/10 inch down	Sand, ¼ inch and less	Gravel, ½ inch and less	Gravel, 1 inch and less	Gravel, 1½ inch and less	Gravel, 2 inch and less
EASTERN:						
Boston, Mass.	1.25	1.00	2.00	1.90	1.75	1.50
Bowmanstown, Pa.	Concrete sand, 1.20; plastering, 1.25; stuccowork, 1.50					
Buffalo, N. Y.	1.00 cu. yd., all sizes					
Buffalo, N.Y. (Niagara River)	.80	.75	.70	.70	.70	.70
Portland, Me.		.50	1.55	1.45	1.35	1.25
Washington, D. C. (t., 2,000 lbs.)	.75	.75	1.45	1.15	.95	.95
CENTRAL:						
Algonquin, Ill.		.50		.50	.50	
Barry, Pike Co., Ill.	.60 to .80, all sizes					
Barton, Wis.	.75	.70	1.00	.70	70	.70
Beloit, Wis. (vicinity)	.50	.50	.60	.50	.50	.50
Chicago	.93@1.03	.83@ .93	1.00@1.20	.93	.83@ .93	.83@ .93
Chicago, Ill.	.83 to .93, all sizes.					
Chicago switching district	L 1.37½* B 1.05*	1.25*	¼" 2.50* ⅜" 1.50*	1.25*		1.25*
	Bank and lake sand, cu. yd. 2500 lbs. Bal., 3000 lbs.					
	F. O. B. track at point of delivery.					
Cincinnati, Ohio	.40@ .50	.40@ .50	.40@ .60	.50@ .60	.50@ .60	.50@ .60
Des Moines, Ia.	.75@1.00	.40@ .50	1.25@1.50	1.00@1.50	1.00@1.25	1.00@1.25
	Concrete mix, 25% gravel, .60.					
Elgin, Ill.	.50	.50	.50	.50	.50	.50
Greenville and Mechanicsburg, Ohio	.40@ .50	.40@ .50	.40@ .60	.50@ .60	.50@ .60	.50@ .60
Illinois, Northern	.60@ .70	.60@ .70	.60@ .75	.60@ .75	.60@ .70	.50@ .60
Indianapolis, Ind.		.50		.65	.65	.65
	Concrete mix, .55.					
Janesville, Wis.	.50	.50			.50	
Jackson, Mich.	.40@ .50	.40@ .50	.40@ .60	.50@ .60	.50@ .60	.50@ .60
Mason City, Ia.	.50@ .60	.40@ .50	1.00@1.20	1.00@1.20	.90@1.20	.90@1.20
	Railroad ballast and road gravel .40@.50					
Milwaukee, Wis.	.90	.90	.90	.90	.90	.90
Moline, Ill.	.50	.50	1.00	.90	.90	.80
Ottawa, Yorkville and Oregon, Ill.	.50@ .60	.50@ .60	.75	.60@ .75	.60@ .75	.60
Rockford, Ill.	.55@ .60	.55@ .60			.60@ .70	
Sabula, Ia.	.60	.60	1.00	1.00	.90	.90
Saginaw, Mich. (vicinity)	.78	.78	1.68	1.43	1.43	1.33
South Bend, Ind.	.50@ .65	.50@ .65	.90@ .95	.70@ .85	.70@ .85	.70@ .85
St. Paul, Minn.	.55@ .80	.55@ .80	1.15@1.30	1.15@1.30	1.15@1.30	1.15@1.30
Terre Haute, Ind.	.75	.75	.85	.75	.75	.75
Montezuma, Covington, Ind.	.75	.75	.85	.75	.75	.75
Wabash Valley District, Ind.	All sizes, .75.					
Winona, Minn.	.60@ .90	.60@ .90	1.00@1.40	1.00@1.40	.95@1.25	.95@1.25
SOUTHERN:						
Charleston, W. Va.		1.10	1.20	1.20	1.20	1.20
Knoxville, Tenn.	.85	.85	1.10	1.10	1.10	1.00
Lake Weir, Fla.	.50					
New Orleans, La.	.75*	.75*	1.35*	1.35*	1.35*	1.35*
Pelzer, S. C.	All sizes, .55, washed but not graded.					
WESTERN:						
Atchison, Kan.			1.40			.90
Denver, Col.		.40*				
Kansas City, Mo.	Carload lots, .40 at plant					
Lincoln, Neb. (carloads)	.52	.52	1.80	1.80		1.80
Lincoln, Neb. (wagon lots)	1.00@1.20	1.00@1.20	2.60	2.60		2.60
Niles, Cal.	.60@1.00	.50@ .80	.60@ .85	.50@ .80	.50@ .80	.50@ .80
	Quotations as at destination, including freight					
Pueblo, Colo.		.60@ .80	.60		1.00@1.50	
Roseburg, Ore.	.60	.60	.50	.50	.50	.50
Saratoga, Santa Clara Co., Cal.	.50@ .60	.50@ .60				
Seattle, Wash.	1.00	1.00	1.75	1.00		1.00
Vancouver, B. C.		.75@1.00		.75@1.00		.75@1.00

Bank Run Sand and Gravel

City or shipping point	Fine sand, 1/10 inch down	Sand, ¼ inch and less	Gravel, ½ inch and less	Gravel, 1 inch and less	Gravel, 1½ inch and less	Gravel, 2 inch and less
EASTERN:						
Attica, N. Y.	.50	.50	.50	.60	.60	.60
Burnside, Conn.	.85*	.85*				
Portland, Me.		$1.50* cu. yd.				
Yardville, N. J.		.40@ .60				
CENTRAL:						
Barton, Wis.	40					
Beloit, Wis. (vicinity)	.30 as found in bank.					
Ottawa, Oregon and Yorkville, Ill.	.45	.50				.60
Sabula, Ia.		.55				
South Bend, Ind.	.30 to .40 according to volume.					
Saginaw, Mich. (vinicity)	.83	.83	1.00	1.00	1.00	1.00
Janesville, Wis.					.50	
Minneapolis, Minn.	.40@ .50	.40@ .50	1.10@1.50	1.10@1.25	1.10@1.25	1.00@1.10
	2800 lbs., 2600 lbs., 2600 lbs., 2600 lbs., 2600 lbs.					
Moline, Ill.	.70					
Portsmouth, Ohio		.65		.85		
Terre Haute, Montezuma & Covington, Ind.					.60	.60
Wabash Valley District	.75					
Winona, Minn.	Pit run gravel under 2-in., .60@.90.					
SOUTHERN:						
Calaveras, Texas		.40@ .50				
Howcott, La.	Running 50% plus on rock content on ⅛" screen, .55@.65					
Knoxville, Tenn.	.85					
WESTERN:						
Atchison, Kan.						.50
Denver, Colo.			.30*			
Pueblo, Colo.	.60 unscreened					
Saratoga, Santa Clara Co., Cal.		.40				.40

*Cubic yard. ¶ .25 millrun; screened .50. B, bank. L, lake.

Passed By The Screens

Sand and Gravel

Montezuma Gravel Co., Terre Haute, Ind., has increased its capital stock from $12,000 to $50,000.

The Salco Sand and Gravel Co., of Little Rock, Ark., has surrendered its charter, says a local newspaper.

The Goodwin Gallagher Sand & Gravel Co. has announced the removal of its offices from 61 Broadway to 21 East Fortieth street, New York.

The Greenville Gravel Co., Greenville, Ohio, has a service flag with 23 stars, probably a record for a gravel producer. The stars include one for H. R. Brown, secretary-treasurer of the company.

The Corning Glass Works has purchased a sand stone quarry at Brownlee, Pa., and it will erect there a grinding plant at a cost of $30,000 to grind the rock into sand for the making of glass.

Street repairs have been stopped in Philadelphia, according to the newspapers of that city, because the government has ordered the Defrain company to discontinue sand mining in the Delaware River. The material used on the streets came from this source.

Broome County, New York, has unearthed a sand mine. When laborers began leveling a slope on the court house grounds in Binghamton a bed of excellent sand came to view. Sand is scarce in Broome County, and dealers offered the county $1 a yard for the material.

The new steamer Beaver, which the Rock Point Sand Co., of Wampum, Pa., is building for towing sand and gravel in the Big Beaver River, is nearing completion. The company's other steamer, the W. B. Miller, is kept busy plying between the sand diggers at Rock Point and the plant at Wampum.

Announcement is made of the increase of the capital stock of the Portsmouth Sand & Gravel Co., Portsmouth, Ohio, from $25,000 to $40,000, and the absorption of the business, machinery, tipple and interests of the Scioto Sand Co. in that city. The Portsmouth company will probably move the Scioto equipment from its present location to the Portsmouth land. The lease of the Scioto company's sand bar is also included in the deal.

What is believed to be a record price for Ottawa (Ill.) sand land was paid by Hubert G. Scherer, a member of the firm of Scherer Bros., to H. J. Ruckrigel. Twelve acres were disposed of by Ruckrigel at a stated consideration of $60,000, or $500 an acre. The property lies just west of the Buffado Rock elevator and embraces some of the richest sections of the bluff lying north of the Rock Island tracks. Mr. Scherer has announced he will take over the plant, which was operated on the site by William Brennan of La Salle, and start mining sand.

Incorporations

Donner Feldspar Co., Ottawa, Canada, has been incorporated.

Economy Stone Works, Montreal, Canada, has been incorporated.

A. D. Monti Granite Co., Cleveland, Ohio; $10,000; by A. D. Monti and D. Aveni.

W. E. Taylor Gravel Co., of Escambia County, Ala., has been organized with a capital of $12,000.

Ryan Stone and Construction Co., Maumee, Ohio; $10,000; Charles W. Ayan, Pearl E. Ryan, Hazel C. Slater, Gerald S. Thomas and J. H. Southard.

R. Harry Shaffer, Cloyd S. Roudabush and William McMeans are organizing a corporation to be called Conemaugh Valley Lime & Coal Co., Johnstown, Pa.; Ray Patton Smith, solicitor.

Atlantic Slate Works, Inc., Manhattan, N. Y.; to buy, sell marble, slate, tile and all kinds of building materials and to manufacture same. Capital, $5,000. Directors: Numan Schwartz, Lizzie Schwartz, 510 West street; Rubin Kreis, 1553 44th street, Brooklyn, N. Y.

Cadiz Coal & Lumber Company, Inc., Buffalo, N. Y.; to crush, quarry, manufacture ore, coal, metal and mineral substances of all kinds. Capital, $300,000. Directors: Harry A. Smith, 264 W. Ferry street; Melbourne C. Burns, 451 Ashland avenue; Carlton J. Meyer, 22 Oneida street, Buffalo, N. Y.

Lime

J. D. Hartman, general manager of the Calcium Products Co., of Holidaysburg, has added another kiln, a Keystone, to his plant, as has also the International Magnesite Co., of Montreal, Canada.

The El Dorado Lime & Minerals Co., of Sacramento, Cal., who recently took over the extensive lime deposits of the Shingle Springs district, are contemplating extensive development work, which will involve the installation of the most efficient machinery.

The newly organized Bone Dry Lime Corporation of Jamestown, N. Y., has elected the following officers: Andrew Davis, president; Eleazer Greene, vice-president; L. J. Mackey, secretary, treasurer and general manager. Mr. Mackey is of Franklin and will maintain his office there for the present. The concern recently acquired extensive deposits at Cassadaga. It is now erecting a large plant. It is said that in addition to the Jamestown people, the Lamberton brothers, bankers at Franklin, are also heavily interested financially.

Retail Dealers

Charles Miller, dealer in lime, St. John, N. B., has sold out to H. J. Carson & Co.

Cincinnati Builders' Supply Co., Cincinnati, has been incorporated. Capital, $10,000. Frank E. Wood.

Fire, on May 8, completely destroyed the granite works of Samuel Mensch, at Bowers Station, near Reading, Pa.

Polish-American Building Company, Inc. (N. Y.), deal in sand, building materials, electric fixtures and construction; $10,000, Buffalo; Stanley W. Kuflak, Frank J. Bieksza, Buffalo.

The annual repairs upon the machinery in the factory of the Peerless Portland Cement Co. at Union City, Mich., are completed, and manufacturing operations have been resumed.

General Supply Co., Fond du Lac, Wis., retail building materials, including cement, brick, stone, etc. Capital, $25,000. Geo. F. Hutter, Edw. A. Aman, Alb. E. Hutter, incorporators.

The Farmers Equity Exchange, Luck, Wis., dealers in cement and lime; $5,000 stock. Jens Jenson, Luck, R. D. No. 2; C. B. Casperson, R. D. No. 1, Luck, Wis.; Niels Sorenson, R. D. No. 2, Luck, Wis.

The Ogdensburg Brick and Sand Co., Inc., Ogdensburg, N. Y.; to manufacture pressed brick, tile and building materials made from clay; to deal in sand; capital, $15,000. Directors: Eustace J. Earl, Robert H. McEween, Jr., Ralph P. Wells, Reuben W. Dobiskey, Herbert W. Flora, John C. Tulloch, Julius Frank, Ogdensburg, N. Y.

Rockefeller & Sinnott, Inc., Brooklyn, N. Y.; to deal in cement and concrete foundation and construction work and to manufacture materials therefor. Capital, $2,000. Directors: Harrison Rockefeller, 332 Lenox road; Thos. J. Sinnott, 203 Parkside avenue, Brooklyn, N. Y.; Justus W. Smith, 60 Wall street, New York City.

The Louisville Builders' Supply Co. has been hard hit by the draft and has been continuously in need of trained men as a result of losing its best salesmen. A. H. Farleigh and B. F. Fields are both first lieutenants, having left the company and taken the officers' reserve course. Joe Coleman, formerly with the City Engineer's office, who has been with the company for a few months, has just been drafted and has reported at Camp Taylor for service.

Quarries

Birdsboro Stone Co. announces that its main office has been moved to 1004 Land Title building, Philadelphia, Pa.

Hardaway Contracting Co., Columbus, Ga., will rebuild the rock-crushing and concrete-mixing plant reported burned at a loss of $60,000.

Charles Angerer, of Scofield, Mich., is making arrangements to open his stone quarry near Maybee. The quarry has been closed down for some time.

The Modern Construction Co. has acquired possession of the Frank Smith farm of 80 acres in Ballville township, Ohio, and it is understood the company intends to put a large stone crushing plant on the property.

Fire on May 22, caused by an explosion, destroyed the boiler plant at the local limestone quarry of the Wharton Steel Co., Ogdensburg, N. J. The structure was about 30x40 feet, one-story, and was used for the generation of power for the operation of the crusher.

The City of Big Timber, Mont., is considering doing its own rock crushing and is in the market for such a machine. The material consists of round boulders, niggerheads and granite, two to twelve inches in diameter; all hard formation. A severe test will be imposed on the machine.

Samuel H. Mensch, of Pottstown, Pa., it is reported, is negotiating for the sale of his farm and limestone quarry near Stowe, in Douglass township, Berks county, Pennsylvania. The buyer is William Abbott Witman, Sr., of Reading, who has other interests in this section. The deal includes the farm of 117 acres, about 1½ miles above Stowe, a crusher and the quarry and its equipment. The quarry is connected with the Reading Railway by a siding a mile in length. The stone in the quarry is of fine quality.

The Bangor Excelsior Slate Co. has given up the lease it held on the Albion slate quarry at Pen Argyl, Pa., and the directors of the Albion Slate Co. have leased the quarry to the Keenan Structural Slate Co., of Bangor. This means that in the future the product of this famous quarry will be largely used for structural purposes instead of roofing. The Albion quarry is one of the most valuable properties in the slate region and was leased by the Bangor Excelsior Co. several years ago, when R. S. Brown and several other operators assumed control of a number of quarries in that section. The operation of the quarry will be actively continued by the new lessees.

Cement

The Edison Portland Cement Co., Hackettstown, N. J., has bought two Ford tractors for use on its farm at New Village.

The Demopolis Portland Cement Co., Demopolis, Ala., will increase their capital from $400,000 to $1,400,000 to provide for expansion.

The Cement Manufacturers' Protective Association, heretofore of Philadelphia, have removed their offices to 19 West 44th street, New York City.

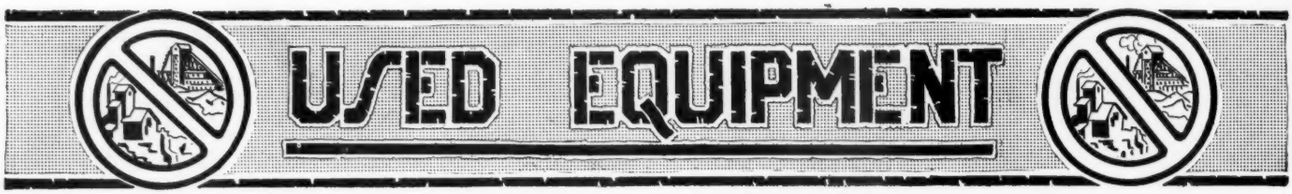
The Newark Lime & Cement Mfg. Co., Bridge street, Newark, N. J., has leased its former works at Front and Bridge streets to the McGann Co.

The Evansville, Ind., Cement Plant, the only one in Birke county, which has been closed all winter on account of coal shortage, has resumed operations.

Personals

Philip M. Pfeil, Jr., has been elected a director and vice-president of the Iron City Sand Co., Pittsburgh, Pa.

H. Mumm, Jr., formerly county engineer for Snohomish county, Washington, and former city engineer for Everett, Wash., has opened an office in the Hutton building, Spokane, as district representative for the Portland Cement Association. His territory covers eastern Washington and the Idaho panhandle.



ADVERTISEMENTS in this department are for the Sale and Want of Second-Hand Machinery and Equipment.

RATES: $2.50 per column inch per insertion.

For Immediate Delivery

1—3-ton Plymouth Gasoline Locomotive, 24" Gauge;
1—No. 16 New Holland Jaw Crusher, extra Rolls for Pulverizing, 18' Elevator, 15-ton Bin and Screen, all on Trucks;
1—50 H. P. Foos Gas Engine;
1—100-H. P. Thomas Electric D. C. Hoist;
1—3⅝" Woods Rock Drill;
1—80 and 1—100 H. P. Locomotive Type Boiler;
24"-36" Gauge Sectional Track;
20 Lbs. Rail Frogs and Switches.

Hoisting Engines, Concrete Mixers, Boilers, Derricks, Sectional Track, Rail, Pipe and Cable

T. J. Lane Equipment Company
Bushwall Building SPRINGFIELD, OHIO

FOR SALE—BARGAIN

Complete outfit for making concrete farm drain tile, Dunn power-press, engine, concrete mixer, forms, etc.

Also set of concrete sewer pipe forms.

Call on or address

MOBILE COAL COMPANY
MOBILE, ALABAMA

FOR SALE

Thew

Steam Shovel

No. 0—⅝-yd. bucket, traction wheels. In absolutely first-class condition. Address

R. J. NOONEY
P. O. Box 210, E. Akron, Ohio

IMMEDIATE SHIPMENT

1—Motor-driven Rock Crushing plant (complete).
2—1500 cu. ft. steam driven air compressors.
20—Crushers, sizes No. 2 to No. 12.
1—Piece ½" Roebling steel cable, 580'. Traction Brand, 10c foot.
4—Pieces ⅝" Roebling steel cable, 285' each. Traction Brand, 11c foot.

POWER PLANT EQUIPMENT.
SEND US YOUR INQUIRIES.

Ross Power Equipment Co.
INDIANAPOLIS, INDIANA

No. 6 Austin Gyratory Crusher

Less Than Half Price!

No. 6 Austin Gyratory Crusher, with extra shaft; used only three months in a cement plant.

Price, $1700 f. o. b. cars Altoona, Kansas.

Stock of Gyratory Crushers in sizes, Nos. 2, 3, 4, 5, 6 and 7½.

Write for prices and description

BUNTING HARDWARE COMPANY
810 Walnut St., Kansas City, Mo.

FOR SALE

Two 40"x12' Gates Revolving screens, complete; in good condition, with two sets of screen plates for each. Holes ½" to 2". Price, complete, F. O. B. cars Flint, Indiana, $400.00 each. We also have one 42"x12' No. 9 Stephens-Adamson Revolving Screen, in excellent condition, with two sets of screen plates. Holes 1" and 2". This machine has been used very little. Price, complete, F. O. B. cars Joliet, Illinois, $500.00. Immediate shipment can be made on all of the above.

AMERICAN REFRACTORIES CO.
315 Union Arcade Bldg., Pittsburgh, Pa.

For Sale by Owner

1—American Hoist Engine, 5½"x8", D. C. D. D., with Sleuthing Attachment & Boiler.
1—No. 5 AUSTIN Gyratory Crusher.
500' 1¼" Plow Steel Cable.
1—INGERSOLL-RAND Air Compressor, Imperial type 10, Double Stage, 12x12 & 7½x12, capacity 327 Cubic Feet, direct connected to General Elec. 50 H. P. Motor with Auto Starter and including Receiver Tank and Automatic Unloader.
1—All Steel Derrick with Bull Wheel and Interchangeable Boom for lengths 30', 60', 90' and 110'.
1—General Elec. 50 H. P. Motor, A. C., 2 phase, 860 R. P. M.

BETTENDORF STONE COMPANY
820 Kirkwood Blvd. Davenport, Iowa

FOR SALE

One No. 2 Clipper

machine, gasoline, non-tractor outfit for blast hole drilling 5-inch tools and belt-driven Ford blower.

The Rocky Ridge Lime and Stone Co.
252 Ohio Building TOLEDO, OHIO

WANTED

One No. 4 McCully Gyratory Crusher, suspended drop bottom type. Address with complete description of machine, price wanted.

J. E. BAKER COMPANY
YORK, PA.

FOR SALE

Traveling derrick, 14' gauge, 8 wheels, 40' mast. 80' boom, 3 drums. Engines 10"x14". Rotary swinging engine. Boiler 60"x10', Locomotive type 3-yd. Williams clamshell bucket. Also electric hoist, 2 drum, with 100 H. P. Motor, 720 R. P. M., 440 volts, 122 amp. 60 cycle, 3 phase all-steel machine and almost new. Can be inspected at Erie.

J. W. OWENS
1908 French Street Erie, Pennsylvania

RAILS

All sections of new and second-hand, on hand for quick shipment. Also purchase old and abandoned plants for dismantling purposes.

M. K. FRANK, Pittsburgh, Pa.

What Do You Want?

What have you that you do not want—and someone else may want?
Do You Want a Better Position?

Then Advertise Rock Products' CLASSIFIED DEPARTMENT fills the bill quickly and satisfactorily ***Do You Want Competent Help?***

It gets immediate attention if you mention ROCK PRODUCTS.

CLASSIFIED ADVERTISING

ADVERTISEMENTS in this department are for Positions Wanted, Positions Vacant, Business Opportunities, Plants for Sale, etc.

RATES: 25c per line, per insertion; minimum charge, 50c. With display of any sort, $2.50 per column inch, per insertion.

Help Wanted

Master Mechanic Wanted

An up-to-date, ambitious and energetic man for a permanent position in an organization where merit is rewarded, to take entire charge of maintenance and repairs of cement mill equipment. Give detailed experience, age and salary you are willing to start for. Address

Box 1256, care Rock Products

WANTED: Competent man to take charge of stone quarry producing crushed stone for railroad ballast, highway purposes and concrete work. State age and experience, also salary required, as well as where last employed. Address Box 1254, care ROCK PRODUCTS.

WANTED: A going California cement factory wants experienced men in all departments. Reply, stating experience, age and salary desired to Box 1260, care ROCK PRODUCTS.

Positions Wanted

POSITION WANTED as manager or Supt. by man of long experience in heavy steam shovel quarrying, where mine or well drill blasting is essential to large output and efficient operation, thorough knowledge of all details in successful operation and management, excellent references. Address Box 1241, care ROCK PRODUCTS.

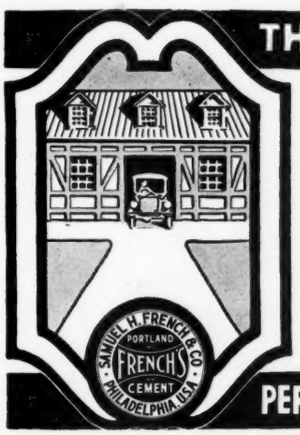
WANTED: Position as general Supt. crushed stone company. Long experience in handling all work connected with extensive production of crushed stone. Convincing references as to character and ability. Available at once. Address Box 1261, care ROCK PRODUCTS.

POSITION WANTED: Technical graduate, formerly engineer and assistant manager of one of the country's largest quarries and crushing plants, wishes position as manager of crushing plant where increase in production and efficiency in operation are desired. Address Box 1259, care of ROCK PRODUCTS.

Plants for Sale

FOR SALE OR LEASE: Crushed stone quarry situated near Wilkes-Barre, Pa. Very hard green sandstone, practically equal to trap rock for road material. Quarry equipped to produce five to six hundred tons per day—has frequently run eight hundred. Ample rail facilities and an extensive market. For detailed information communicate with Arthur L. Stull, 182 S. Franklin St., Wilkes-Barre, Pa.

FOR SALE: Limestone Crushing and Pulverizing plant, on Southern Railway, North Alabama. First class, very cheap, stone inexhaustible, best quality. Gone to Army—must sell. For full details address 2237 Doswell Avenue, St. Paul, Minnesota.



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Protection from fire, deterioration or loss in appearance are the requirements of the perfect building material. All requirements of proper building are best answered with concrete.

Samuel H. French & Co.

Est. 1844 PHILADELPHIA

PERMANENT CONSTRUCTION

Best Bros. Keene's Cement

The Plaster That Stands Hard Knocks

Has been used successfully for over a quarter of a century. Prices and illustrated literature containing full information gladly furnished on request. *Write Today!*

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Established 1889

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It Pays

Tell the advertiser you saw his ad in ROCK PRODUCTS. He'll appreciate it.

BOSTWICK

TRUSS LOOP
TRUS-V-RIB
Metal Lath

Bostwick Corner Bead, Bostwick Snap Bead, the only Bead to straight edge long concrete girders, beams and columns; Bostwick Wall Plugs, Bostwick Wall Ties, the Bostwick "Y" Tie, which bonds the usual number of bricks with half the usual number of Ties. A complete line—a complete stock—immediate shipments—satisfactory service.

Write for loose-leaf catalog to-day

THE BOSTWICK STEEL LATH COMPANY **Niles, Ohio**

ALPENA HURON MICH. HURON PORTLAND CEMENT COMPANY

Daily Capacity 9,000 Barrels

MORE THAN FIFTEEN YEARS OF SATISFACTION

GREAT WATER AND RAIL FACILITIES BEST SERVE THE ENTIRE MIDDLE WEST
FIVE PLANTS: ALPENA, DETROIT, WYANDOTTE, CLEVELAND AND DULUTH

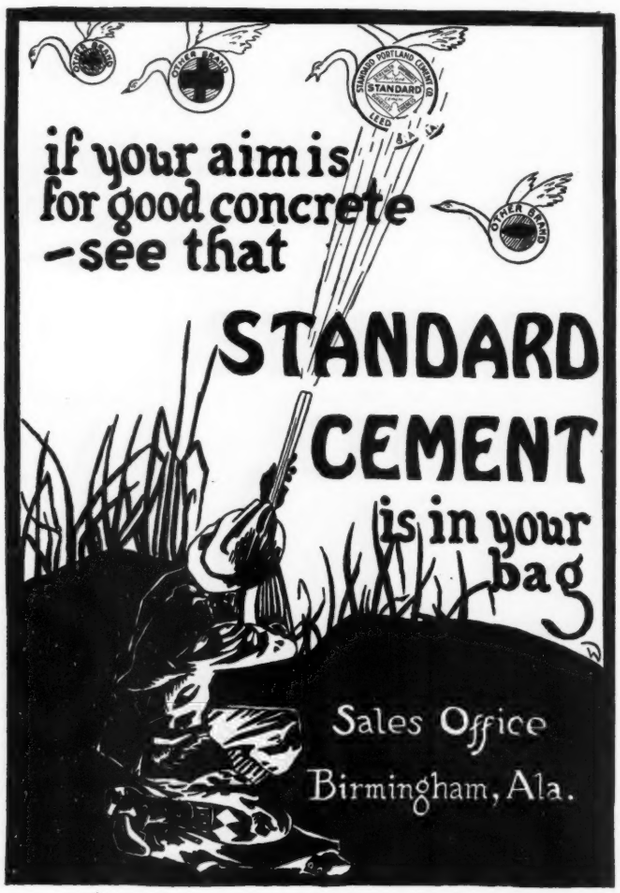
HURON and WYANDOTTE

EVERY BARREL TESTED AND GUARANTEED
SOLD BY THE BEST DEALERS USED BY THE BEST BUILDERS

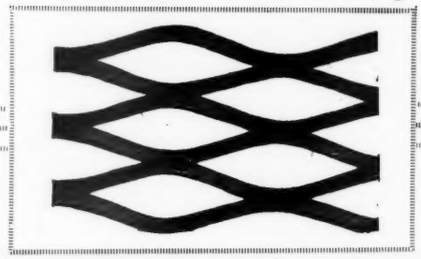
Main Offices: 1525 Ford Building, Detroit, Michigan

WYANDOTTE PORTLAND CEMENT CO. WYANDOTTE, MICH.

Quality, Quantity, Service



See That Metal Lath?



IT'S Penco Expanded Metal Lath. Note the slanting trussed arrangement of the extra-wide strands with a 3/8-inch opening. An ideal construction!

What's Behind Your Plaster?

Penco Metal Lath is not a back-ground for plaster; it is a reinforcement. Do not be satisfied with less.

Send for complete catalogue of Penco "better" products. It includes, besides metal laths, corner beads, metal stud and all forms of sheet iron and steel building materials.

PENN METAL COMPANY
559 West 36th St., **NEW YORK**

It gets immediate attention if you mention ROCK PRODUCTS.

How "McMYLER INTERSTATES" Are Keeping Building Supply Yards Clear

The photo shows a typical McMyler Interstate crane installation in a busy Building Supply Yard.

The cranes work 24 hours a day for weeks at a time. They are equipped with large clam shells for unloading from boats into cars or stock pile. Freight cars are never delayed at a yard equipped with one of these machines because they are either quickly loaded or unloaded and again sent out on the main line.

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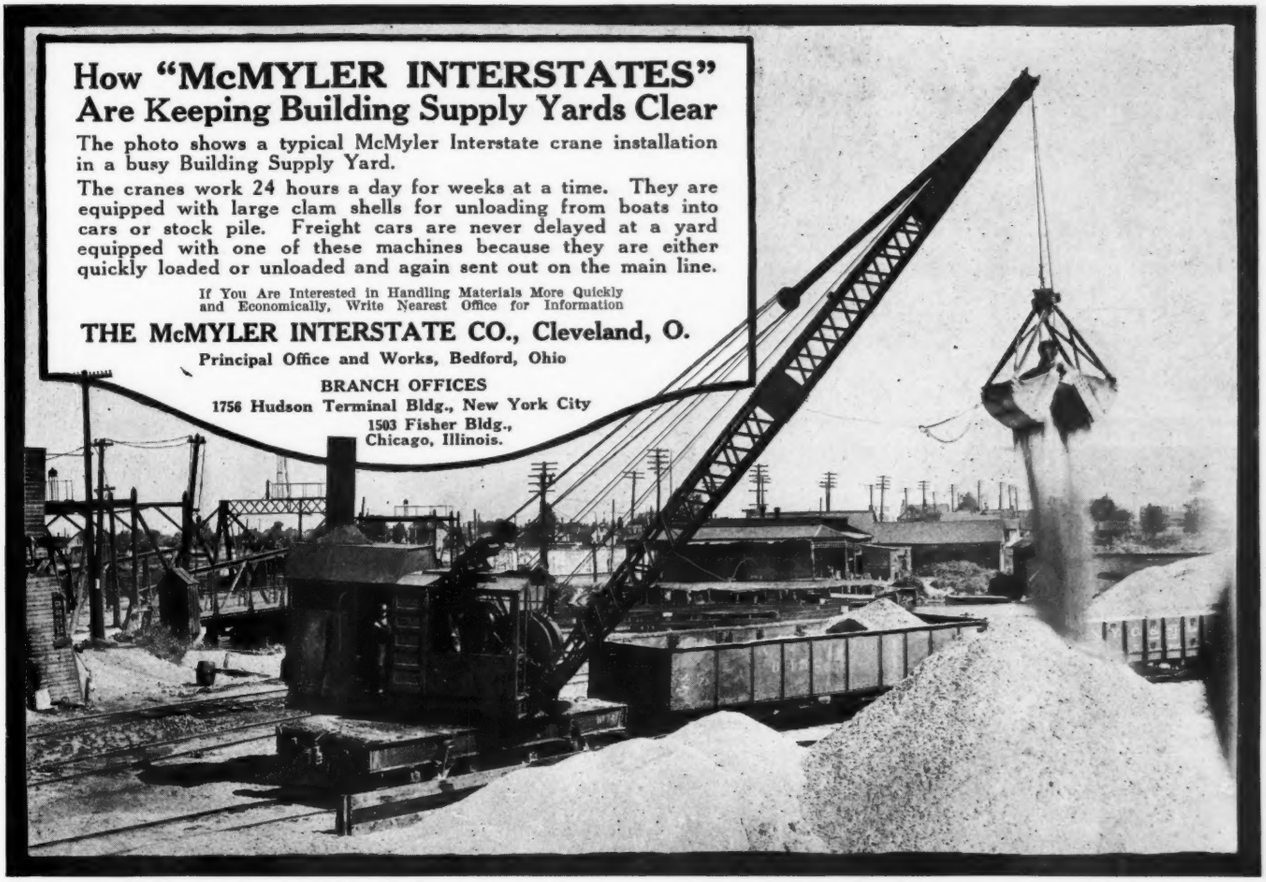
THE McMYLER INTERSTATE CO., Cleveland, O.

Principal Office and Works, Bedford, Ohio

BRANCH OFFICES
1756 Hudson Terminal Bldg., New York City
1503 Fisher Bldg., Chicago, Illinois.



CONCRETE FOR PERMANENCE

It's building-time now

Six months of good building weather ahead.

Atlas advertising is working right along to put good business into your hands.

Any number of people in your community are planning to build houses, garages, factories, or roads. You might as well have your share of this business.

Get them to use stucco for the house or garage—concrete for the factory or road. These sales of Atlas-White and Atlas Portland Cement carry orders for sand, stone, lumber and many other building materials.

Send the coupon below for the Atlas Almanac and of Atlas active selling help.

The Atlas Portland Cement Company

Member of the Portland Cement Association

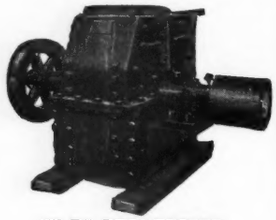
New York Chicago Philadelphia Boston St. Louis Minneapolis Des Moines Dayton Savannah

PORTLAND
ATLAS CEMENT

"The Standard by which all other makes are measured"

The Atlas Portland Cement Co., 30 Broad St., New York, or Corn Exchange Bank Bldg., Chicago:
Send me copies of Atlas Almanac and information about Atlas co-operation for increasing sales.

Name..... Address.....



"K-B" PULVERIZER
Built for Service and Durability

Make Agricultural Lime and Limestone

The Government is urging the use of Agricultural Lime by Farmers and such shipments are exempt from embargoes.

You want the K-B Pulverizer

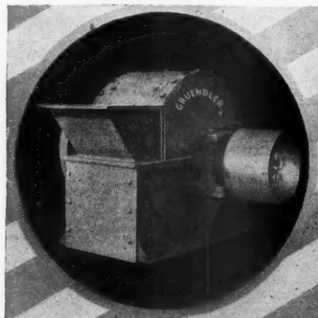
Because its rugged all-steel construction withstands the most severe service. Its manganese steel linings protect all parts from wear. Its adjustable U-Type manganese steel hammers insure a uniform product, with high capacity—and low power consumption.

Send for Catalog and full particulars

K-B PULVERIZER COMPANY, Inc. 86 Worth St. NEW YORK

K-B PULVERIZER

PERFORATED SCREENS
MADE TO SUIT YOUR REQUIREMENTS
Let Us Quote Prices
SERVICE and DELIVERY
NORTMANN-DUFFKE FDY. CO.
1200 27th Ave. MILWAUKEE, WIS.
THE MARK OF QUALITY



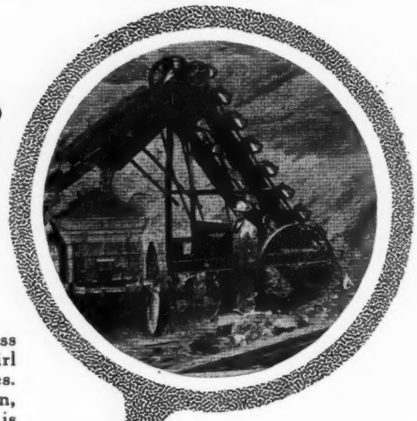
GRUENDLER
Crushers and Pulverizers

are especially adapted for pulverizing limestone for fertilizing purposes; will increase your profits by increasing your production approximately 50%. The double-ended hammer arrangement is the reason.

Let us explain

Gruendler Patent Crusher and Pulverizer Co.
ST. LOUIS, MISSOURI

Saves Money, Time, Labor



Whrrrr! The endless chain of buckets whirl for a few minutes. Then the wagon, freight car or truck is full. A wonderful solver of the labor problem as well as the means of getting full service out of trucks.

Why the Haiss Patented Digging Wagon Loader is the premier of them all is explained in our illustrated catalog.

Get Catalog from
Geo. Haiss Mfg. Co.
146th St. and Rider Ave.
NEW YORK CITY

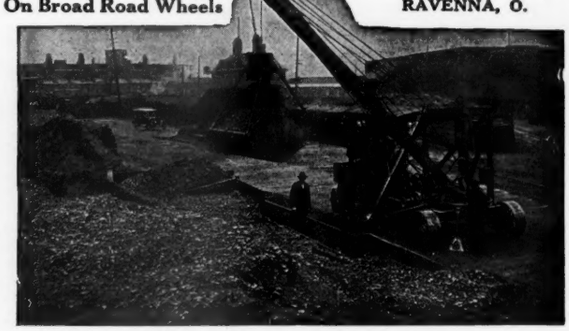
HAISS
PATENTED
Digging Wagon Loader

SCREENS
of All Kinds

Chicago Perforating Co.
2445 West 24th Place
Tel. Canal 1459 CHICAGO, ILL.

Byers Auto-Cranes
On Broad Road Wheels

John F. Byers Machine Co
310 Sycamore Street
RAVENNA, O.



Quality AWC Service

Wire Cloth

DON'T delay ordering the wire cloth that you will soon need if you do not already require it.

If you have never done so before, we urge you to send your order to us and in addition to the best wire cloth, get prompt, courteous service. If you have ordered before, we need not urge you. *Remember—NOW!*

AUDUBON WIRE CLOTH CO., Inc.

FACTORY AND OFFICE:
AUDUBON, N. J.
4 Miles from Philadelphia

Manufacturers of Wire Cloth and Screening in all sizes and meshes. Made of iron, steel, brass, copper, galvanized and special metals. Rock, crushed stone, sand and ore screens. All grades of sieves and riddles.

ERIE Revolving Shovels

This Erie is equipped with a crane boom, and is handling a clam-shell with splendid results. Owned by HURON SHORE GRAVEL CO., Saginaw, Mich.

"Our Erie is giving fine service as a crane"

"We have used our Erie for a year and a half, but it has cost us practically nothing for repairs. We have equipped the Erie with a Crane boom and a ¾-yd. clam-shell bucket. It digs gravel, strips, and transfers gravel from cars to stock pile, and vice versa, with dispatch.

"It is a very useful tool, and has given us the best of service. We are well pleased with the Erie's efficiency and value."—(*Signed*) *John S. Porter, Secy., Huron Shore Gravel Co., Saginaw, Mich.*

The Erie is equally valuable as shovel or crane. And you have a machine that is built far stronger than the usual standard; a shovel or crane that is RELIABLE.

Find out which is the best revolving shovel on the market. Write for our Bulletin "P."

BALL ENGINE CO.
Erie, Pa.

Loaders

reduce your labor list; increase the efficiency of the few necessary hands; keep your trucks busy and improve your service. *Dealer* or *producer* can use G-W Loaders to advantage.

Be sure you select G-W Loaders. The frames of light steel make them easy to move. The machines are collapsible so that they can be easily wheeled in sheds, etc. Other features explained in our literature.

Write for Catalogue No. 16-R

GIFFORD-WOOD COMPANY
Main Office: HUDSON, N. Y.
New York Buffalo Boston Chicago Philadelphia

O'Laughlin Screens

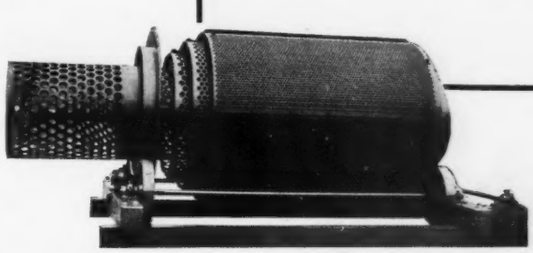
Do you know that the heads at the end of the inner screen cylinder are fitted with removable steel tires which can be replaced after several years' wear at small cost? And that the two heads revolve on four special steel-faced trunnions, of carwheel specification, which last for many years?

These are two of the long-wear features which have reduced screen cost for crushed stone, sand and gravel producers. And they are smooth running!

A Waukesha, Wisconsin, user says: "We have been using O'Laughlin Screens for over five years and must say that they are very economical in regard to repairs and power consumption."

Get Details from the

JOHNSTON & CHAPMAN CO.
2921 Carroll Avenue, CHICAGO, ILL.



Perforated Metal Screens
FOR
Stone, Gravel, Sand, Etc.

ELEVATOR BUCKETS
PLAIN AND PERFORATED

General Sheet and Light Structural Work

HENDRICK MFG. CO.
CARBONDALE, PA.
New York Office, 30 Church Street

POWDERED FUEL

Regional coals only are now available.

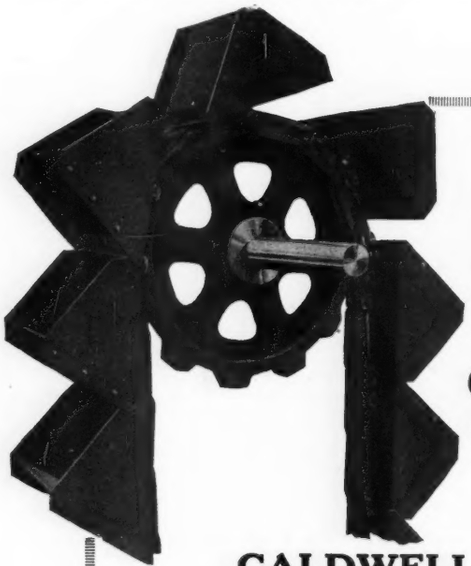
Some of them are poorly fitted for manufacturing purposes.

"Lopulco" systems burning coal in suspension make possible the efficient use of these inferior coals as well as lignite and peat.

Lopulco TRADE MARK

Industrial Department

LOCOMOTIVE PULVERIZED FUEL COMPANY
Designers and Builders of Complete Installations
30 Church Street, New York
Transportation Bldg., Montreal



WRITE for Our Large and COMPLETE CATALOG

CALDWELL BUCKET ELEVATORS

are built on the lessons of forty successive years of manufacture. We are familiar with your needs and this knowledge, together with good materials, and the best of workmanship, enables us to offer you a satisfactory product.

In addition to manufacturing bucket elevators, we design and build to individual and general needs; "Helicoid" Conveyors; Sectional Flight Conveyors; Elevator Buckets; Steel Casings for Elevators and Conveyors; Gears (cut or machine-moulded teeth); Chilled Rim Sprockets; Malleable and Steel Chain; Bearings; Pulleys and Friction Clutches.

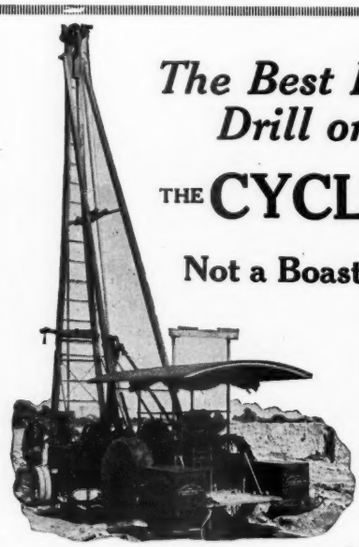
Tell us your need

H. W. CALDWELL & SON COMPANY
17th & Western Avenue CHICAGO
50 Church Street, New York

The Best Blast-Hole Drill on Earth

THE **CYCLONE** No. 14

Not a Boast—A FACT



We will prove the superiority of the No. 14 Drill by placing one of the outfits in your quarry against any or all other makes.

If the Cyclone doesn't out-drill and out-wear all other drills, we will remove it from the work without cost to you.

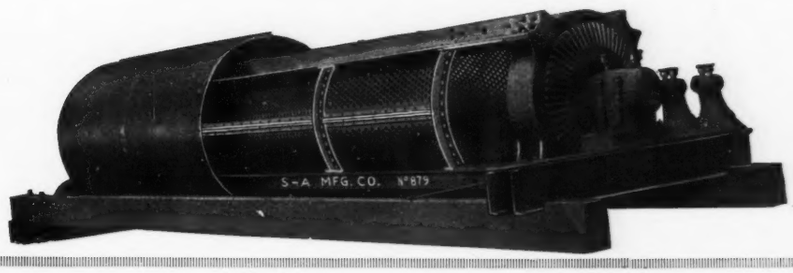
Our proposition gets below the paint—it eliminates talking points and evaporates hot air. It puts buying on a strictly engineering basis where it belongs.

Furnished in Steam, Gasoline, Compressed Air or Electric Power Traction or Non-Traction

Let us send you full particulars

THE SANDERSON-CYCLONE DRILL CO.
ORRVILLE, OHIO
Eastern and Export Office, 50 Church Street, New York

It gets immediate attention if you mention ROCK PRODUCTS.



S-A Revolving Screens

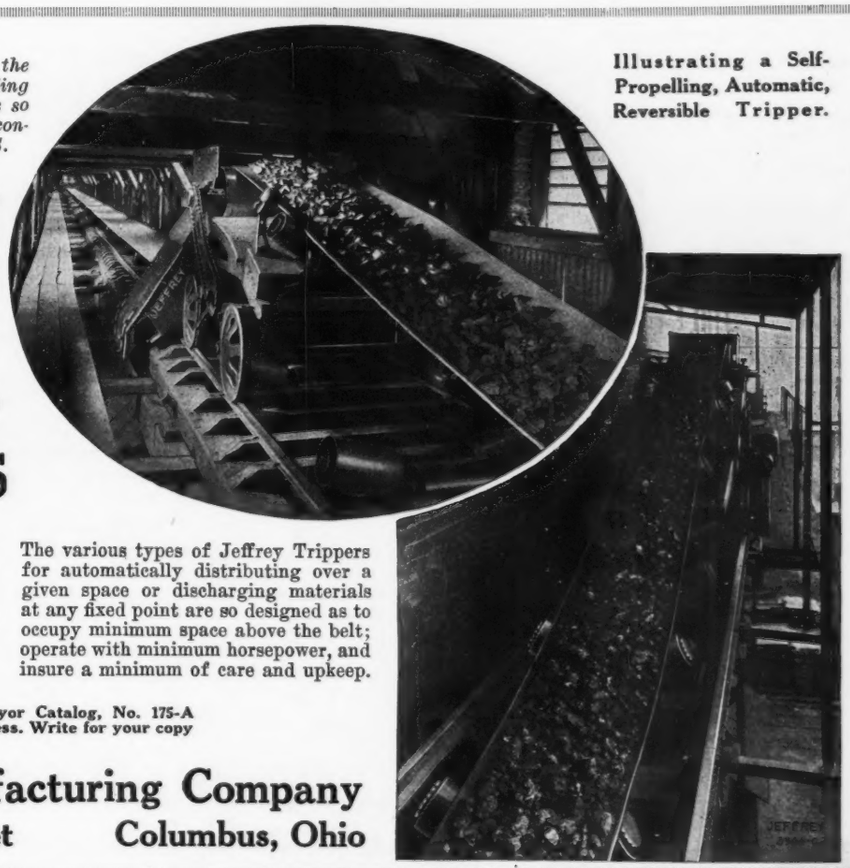
come in a variety of sizes and styles—one suited for each need. The No. 9 Screen, shown above is one of largest and heaviest manufactured. It is built to meet the requirements of plants where large capacity results in severe service and the necessity for rugged equipment.

The S-A No. 9 Screen is formed of cast iron ends securely connected by heavy, angle-bar irons to which the screen plates are bolted. This eliminates the use of spiders or any internal obstructions. Other good features are explained in our catalog.

We design and manufacture conveying machinery for rock crushing plants, gravel washing plants, storage systems and other purposes, as well as transmission and screening equipment, elevators, gates, feeders, car pullers and other specialties. Just tell us your need.

STEPHENS-ADAMSON MFG. CO.
AURORA, ILLINOIS

"And in no other type of carrier are the elements for the quick and silent handling of large capacities of various materials so effectively combined as in the belt conveyor." C. M. S.



Illustrating a Self-Propelling, Automatic, Reversible Tripper.

No stronger endorsement or argument than the above is needed for

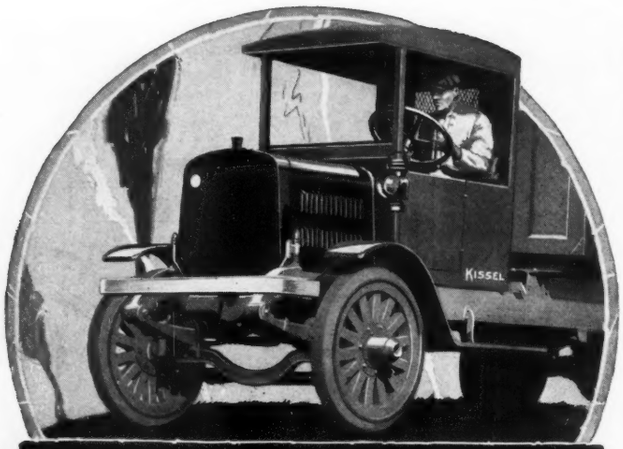
JEFFREY
RUBBER BELT CONVEYORS

"Our" Century Belts, as well as the carriers used, are designed especially for the hard service of conveying Rock, Ores, Stone, Gravel, Coke, Coal and other heavy materials, and therefore are a composite of the best of materials and practical engineering service.

The various types of Jeffrey Trippers for automatically distributing over a given space or discharging materials at any fixed point are so designed as to occupy minimum space above the belt; operate with minimum horsepower, and insure a minimum of care and upkeep.

Our New Belt Conveyor Catalog, No. 175-A will soon be off the press. Write for your copy

The Jeffrey Manufacturing Company
935 North Fourth Street Columbus, Ohio



KISSEL TRUCKS

The War Has Developed New Truck Construction Standards to Meet Your Requirements

STRENGTH must be in abundance—unlimited power absolutely necessary—economy desirable, but dependable performance first. These service essentials reach their highest development in Kissel Trucks.

Kissel, realizing the unusual service now demanded of trucks, has built into Kissel Trucks proven mechanical features and structural innovations that have been proven out in over a hundred different lines of business. The sturdy Kissel-built engine, perfected worm-drive rear axles, heavy duty front axles, heat-treated frame, springs, brakes, etc., are designed in harmonious proportions and perfectly balanced, to reduce wear and prolong the life of the truck.

Some of the largest concerns in the Rock Products field are Kissel Truck owners. See your nearest Kissel dealer for reasons why.

KISSEL MOTOR CAR COMPANY
Hartford, Wisconsin U. S. A.

UNIVERSAL CRUSHERS

The biggest value for your money. Universal crushers and pulverizers reduce stone to desired size or fineness in a jiffy!

Fifteen years of designing and building experience have made possible the exceptional ability of Universals.

Universal Crusher Co.
225 Third Street
Cedar Rapids, Iowa, U.S.A.

Ask for Folder 1918

Kennedy Crusher

Admitted to Be the Best

OUR STOCK LIST

We have the following machines on hand; finished or semi-finished; for quick shipment. We also have manganese parts in stock.

2 No. 3 Crushers	1 No. 10 Crusher
1 No. 4 Crusher	1 No. 27 Crusher
4 No. 5 Crushers	1 No. 30 Crusher
1 No. 6 Crusher	1 No. 37 Gearless Crusher
1 No. 7 Crusher	1 10x7 Roll Jaw Crusher
2 No. 8 Crushers	1 20x10 Roll Jaw Crusher

Manufactured by

KENNEDY-VAN SAUN MFG. & ENG. CORP.
120 Broadway NEW YORK CITY

A GIANT in strength

New and exclusive features make this machine the last word in strength and durability

This is the machine that crusher operators have been waiting for—the crusher with the new vital improvements that you will find in no other type. The originality of its design results in Greater Capacity, Less Wear, Longer Life, Lower Power Consumption.

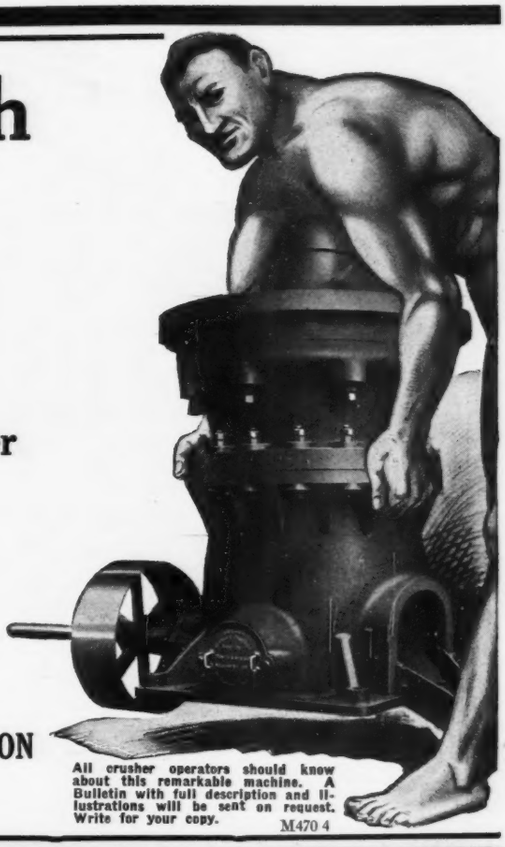
The New
Superior-McCully Gyratory Crusher

Reg. U. S. Pat. Office

Life of "Eccentric and Gears" are lengthened 200% because all dust and grit are absolutely excluded and Cut Gears run quietly in oil. Main shaft is 50% stronger than Standard Gyratories of corresponding opening. Area of eccentric 75% greater than any other machine of equal size.

Capacities—30 to 1000 tons per hour, built in sizes from 10 in. to 54 in. opening.

The Superior-McCully Gyratory Crusher deservedly won the biggest order ever placed for Gyratory Crushers covering sixteen 14-in. machines, each having a capacity of 80 tons per hour, awarded by the Chile Exploration Co.



All crusher operators should know about this remarkable machine. A Bulletin with full description and illustrations will be sent on request. Write for your copy. M470 4

WORTHINGTON PUMP AND MACHINERY CORPORATION

115 Broadway, New York

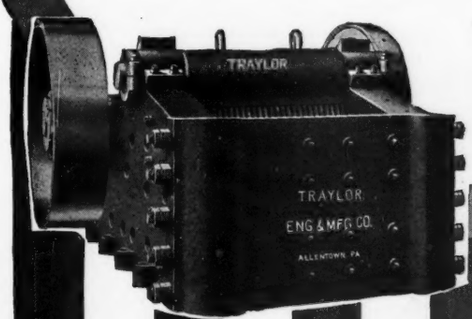
Power and Mining Machinery Works, Cudahy, Wisconsin
Chicago Office: 820 Old Colony Building

A TRAYLOR JAW CRUSHER

Will Meet Your Every Crushing Need

They are built in FIVE TYPES: some with either solid or sectional frames of cast semi-steel, others of cast steel with box section frames cast in one piece or made sectional—and in THIRTY-SIX SIZES, starting with the little 7x10-in. Crusher, weighing 8,000 lbs., and finishing up with the Giant Crusher, weighing 680,000 lbs., having a jaw opening of 66x86 in.

The Largest Crusher in the World



TRAYLOR ENG. & MFG. COMPANY

ALLENTOWN, PENNA.

30 Church St., New York
Chicago Office: 1414 Fisher Bldg.

SEND FOR BULLETIN R-J2 IT'S NEW

"O.K." Says the U.S.A.

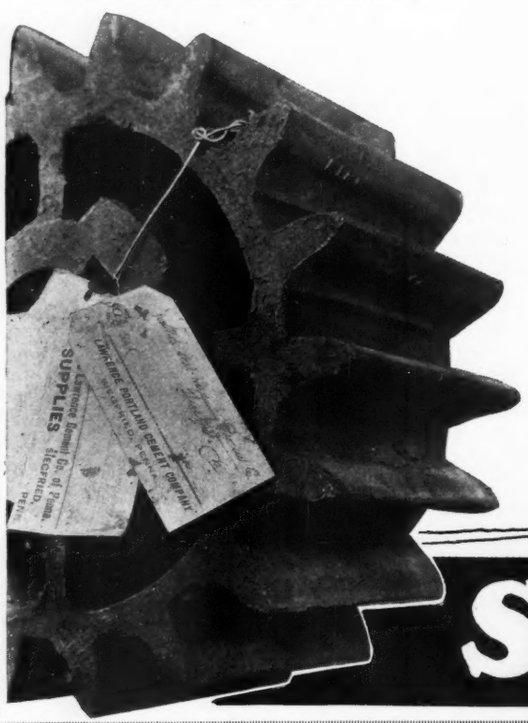
Limestone in its various forms —for agricultural purposes—is being favored by the Government. Freight cars are at the service of the producers who make agricultural shipments.

The Bradley THREE ROLL Mill

will put you into this profitable field with both feet. While others make claims, we can prove that the Bradley Mill will produce the finest product at the lowest cost. The Bradley takes ¾ inch material and reduces it to a fine powder in one operation. Our catalogue gives details. *So Ask For It--TODAY!*

BRADLEY PULVERIZER CO.
Boston, Mass. **Works: Allentown, Pa.**
Works: ALLENTOWN, PA.

By the Stroh Process the parts of machinery subjected to wear are composed of Stroh Alloy. It is harder than the finest tool steel. The rest of the casting is of softer metal—all made at one pouring.



Here's an excerpt from a letter we ran across in the files

the other morning. It's old, but that just goes to prove that Stroh Steel has been delivering the goods for a long time. We get the same kind of reports today.

——"On November 15, 1912, you placed a Stroh Steel Pinion on one of our tube mills in the raw material department. From that date to the morning of December 29, 1913, the mill has run 8,277 hours, and we find on examination that the pinion is still in good condition, showing very little wear. (Signed) Chas. H. Porter, Supt., LAWRENCE PORTLAND CEMENT CO."

As we have said before: STRONG—where necessary; TOUGH—where necessary; HARD—where necessary.

FOR DETAILS WRITE TO THE

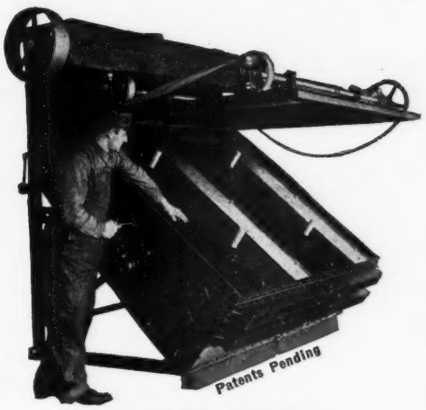
Stroh Steel-Hardening Process Company
PITTSBURGH, PA.

F. Lloyd Mark, Western Manager, Monadnock Building, Chicago.

Stroh Steel

Cooperation is the thing—please mention ROCK PRODUCTS.

The "Keystone" of Vibrating Screens



WHIP-TAP
Separator Screen
Screens Limestone, Silica, Gravel and other Rock Products

WRITE FOR PARTICULARS

A TAUT screening surface at "drumhead" tension is the keystone of an efficient vibrated screen around which everything else must be built.

Without a taut screening surface, effective vibration is impossible and the maximum tonnage and thorough separation cannot be obtained.

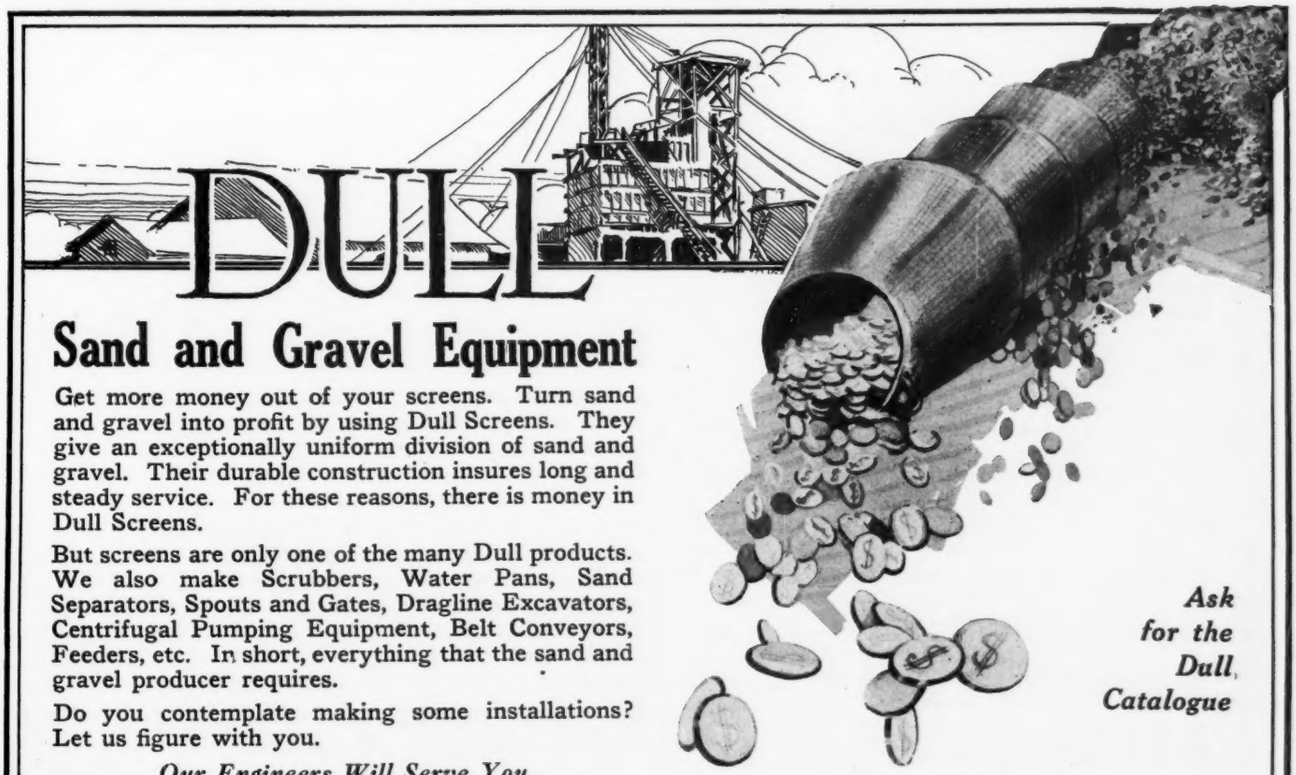
In the WHIP-TAP Separator, no tacks, bolts, or rivets, are used in attaching the wire cloth to the screen frame—as shown in above drawing, every wire of the screening surface is turned over and firmly clamped into a metal edge which hooks over the frame; and, when the tension is applied by turning the stretcher bars (of which there are three) with a key, the frame expands and every individual cross wire is stretched taut.

WHIP-TAP screen cloths are always operated at drumhead tension; every wire is vibrated; the material is spread over the entire screen; and the maximum tonnage of closely sized product is produced.

THE W. S. TYLER COMPANY

Manufacturers of TYLER "Double Crimped" Wire Cloth and Mining Screen.

CLEVELAND, OHIO



DULL

Sand and Gravel Equipment

Get more money out of your screens. Turn sand and gravel into profit by using Dull Screens. They give an exceptionally uniform division of sand and gravel. Their durable construction insures long and steady service. For these reasons, there is money in Dull Screens.

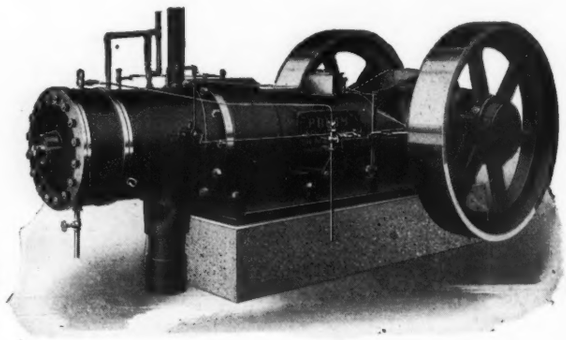
But screens are only one of the many Dull products. We also make Scrubbers, Water Pans, Sand Separators, Spouts and Gates, Dragline Excavators, Centrifugal Pumping Equipment, Belt Conveyors, Feeders, etc. In short, everything that the sand and gravel producer requires.

Do you contemplate making some installations? Let us figure with you.

Our Engineers Will Serve You

Ask for the Dull Catalogue

THE RAYMOND W. DULL CO. 1914 Conway Building Chicago



PRIMM OIL ENGINES

Throw Out Your Fuel Hogs

Come what may, you can eliminate, from your list of supply necessities, coal and other serious fuel problems.

It will pay you to replace your present power plant with a PRIMM.

THE POWER MFG. CO., Dept. No. 2 Marion, Ohio

G-R-M SAND SETTLING TANK

Makes a good salable product from sand otherwise too dirty to be considered.

Makes a definite and positive separation between the sand and the dirt.

Gets full value out of waste water—it overflows when carrying as much dirt as it can carry.

Keeps water out of the sand bin. Sand is well drained before it is dropped. No leaks. No dripping bin.

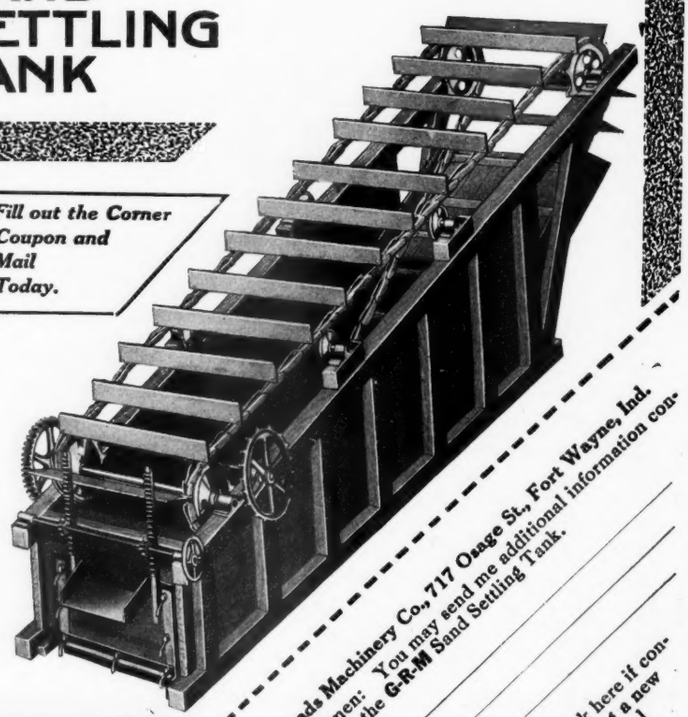
Reduces worry. No automatic valves to stick shut, or to stick open, or to dribble.

Permits grading sand by gravity. No fine screens needed. Uses gravity only. Positive removal of coarse particles from the finest, so that "engine sand" and "sand-blast" sand may be produced.

GOOD ROADS MACHINERY CO.

717 Osage St. FORT WAYNE, IND.

Fill out the Corner Coupon and Mail Today.



Good Roads Machinery Co., 717 Osage St., Fort Wayne, Ind.
Gentlemen: You may send me additional information concerning the **G-R-M** Sand Settling Tank.

Name_____

Address_____

☐ Check here if considering a new gravel plant

The advertiser wants to know that you saw his ad in ROCK PRODUCTS.

DU PONT AMERICAN INDUSTRIES

Learn About Du Pont Products

to get acquainted with a reliable source of supply, simplify selection and to be sure of getting material ordered.

The Best for the Purpose

To the making of all Du Pont Products is applied the same integrity of purpose, adherence to standards, and maintenance of quality as have made Du Pont Explosives the standards.

Determine your choice of supplies by learning what Du Pont American Industries make to meet your exacting requirements.

Learn about Du Pont Products,—mark and mail the coupon.

E. I. du Pont de Nemours & Co.

Powder Makers Since 1802. Wilmington, Del.

Note:

When in Atlantic City, visit Du Pont Products Store, Boardwalk and Penna. Ave., and Du Pont Shooting School on Ocean End of Young's Million Dollar Pier.

The Du Pont American Industries Are:

E. I. du Pont de Nemours & Co., Wilmington, Del., Explosives.

Du Pont Chemical Works, New York, Pyroxylin and Coal Tar Chemicals.

Du Pont Fabrikoid Co., Wilmington, Del., Leather Substitutes.

The Arlington Works, 725 Broadway, New York, Ivory Py-ra-lin and Cleanable Collars.

Harrison Works, Phila., Pa., Paints, Pigments, Acids, Chemicals.

Du Pont Dye Works, Wilmington, Del., Dyes, Dye Bases.

MAIL THIS COUPON

Marking X Before Subject of Interest to

E. I. du Pont de Nemours & Co.

Adv. Div. E. I. 115, Wilmington, Del.

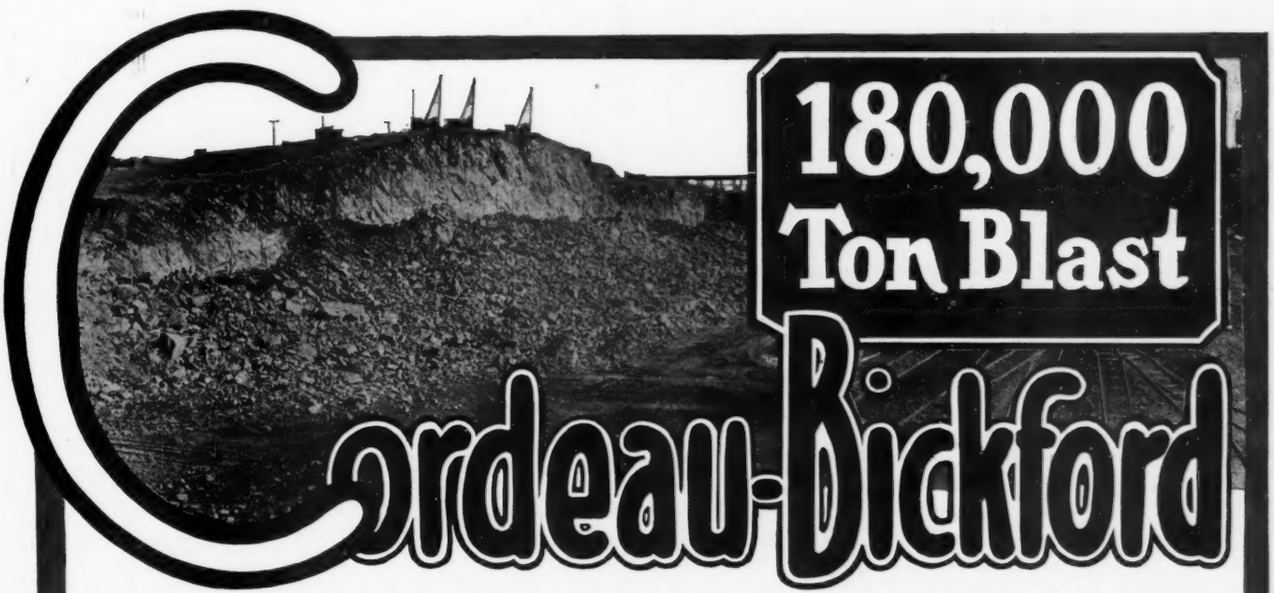
☐Blasting Supplies	☐Fabrikoid—Motor
☐Blasting Powders	☐ " Craftsman
☐Industrial Explosives	☐ " Book-Finish
☐Sporting Powders	☐ " Truck Special
☐Trapshooting	☐ " Marine Special
☐Hunting	☐Fairfield Rub'r Cloth
☐Harrison Paints	☐PY-RA-LIN Spec'l'ts
☐Vitrolac Varnish	☐ " Toilet Goods
☐Flowkote Enamel	☐ " Sheeting
☐Auto Finishes	☐Challenge Collars
☐Sanitary Wall Finish	☐Commercial Acids
☐Antioxide Iron Paint	☐Ethers
☐Bridgeport Wd. Finish	☐Bronze Powders
☐Metal Lacquers	☐Pontoklene
☐Pigment Bases	☐Tar Distillates

NAME .....

PLACE .....

BUSINESS .....

DU PONT



180,000 Ton Blast

Cordeau-Bickford

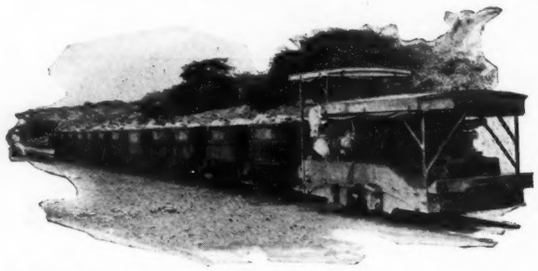
THE record-breaking blast of the Bethlehem Mines Corporation, pictured above, was made on February 25. 52,500 pounds of powder, distributed in 60 well holes, were used. Note the uniform, fine breakage secured. 180,000 tons of rock were shattered. OF COURSE CORDEAU-BICKFORD FUSE WAS USED IN EVERY HOLE.

CORDEAU-BICKFORD adds from 10 per cent to 20 per cent to the efficiency of any explosive. Furthermore CORDEAU-BICKFORD is safe. It is insensitive to shock or friction.

THE ENSIGN-BICKFORD CO., Simsbury, Connecticut

Original Manufacturers of Safety Fuse

ESTABLISHED 1836



Making Production "Hump Itself" in the West Indies

PRODUCTION managers in America aren't the only ones who "have their troubles"—nor are they the only ones who know where to turn when the supply of skilled labor runs low.

Messrs. John Godden & Co., managers of a big Phosphate Rock Mining Concern in Curacao, West Indies, are constantly up against the problem of keeping to capacity with untrained native helpers.

Several years ago they outgrew ordinary facilities, so, in 1915, they bought a PLYMOUTH Gasoline Locomotive and set it to work.

In 1917, with orders still on the climb, they purchased another PLYMOUTH; and, in expressing their satisfaction with both Locomotives, they write

Two PLYMOUTH Locomotives Hauling Phosphate Rock—Powerful, Easily Operated

"Each has given complete satisfaction, while their simplicity of operation is important where one has native labor to deal with."

Messrs. Godden & Co. appreciate the ease of keeping their Locomotives in active, profitable service. Then, the PLYMOUTH'S ability to run right along, month in and month out, with a minimum of lost time due to repairs and replacements, is a big object when working so far away from "the home base."

Write Us About Your Hauling

PLYMOUTH Gasoline Locomotives are ready to do *your* hauling in just this same business-like, efficient, economical way. They are an established success—design and performance proved right through years of testing out in a wide variety of industries.

Write us about your hauling requirements, and let us furnish details and tell you where you can see PLYMOUTH Gasoline Locomotives at work. No obligation in making the request.

THE J. D. FATE COMPANY

210 Riggs Avenue **PLYMOUTH, OHIO**

Sales Representatives in all Principal Districts

6

Classified Business Directory

BAGS AND BAG MACHINERY
Jaite Company, The
Urschel-Bates Valve Bag Co.

BRICK CLAMPS
Bostwick Steel Lath Co.

BUCKETS, DUMPING AND GRAB
Haiss, Geo., Mfg. Co., Inc.

CALCINING MACHINERY
Atlas Car & Mfg. Co.
Butterworth & Lowe

CEMENT, PORTLAND
Alpha Port. Cement Co.
Atlas Port. Cement Co.
Carolina Portland Cement Co.
French, Samuel H., & Co.
Huron Wyandotte Portland Cement Co.
Peerless Portland Cement Co.
Standard Portland Cement Co.
Wolverine Portland Cement Co.

CHAINS AND TRANSMITTING MACHINERY
Stephens-Adamson Mfg. Co.

CONVEYORS AND ELEVATORS
Caldwell, H. W., & Son Co.
Ehrsam, J. B., & Sons Mfg. Co.
Good Roads Mach. Co.
Jeffrey Mfg. Co., The
Webster Mfg. Company
Gifford-Wood Co.
Stephens-Adamson Mfg. Co.
Weller Mfg. Co.

CRANES
Locomotive Gantry
Ball Engine Co.
Byers Mach. Co., John F.
McMyler-Interstate Co.
Ohio Locomotive Crane Co.

CRUSHERS AND PULVERIZERS
Allis-Chalmers Mfg. Co.
American Pulverizer Co.
Austin Mfg. Co.
Bacon, Earle C.
Bradley Pulverizer Co.
Butterworth & Lowe
Chalmers & Williams
Good Roads Mach. Co.
Gruendler Pat. Crusher & Pulverizer Co.
Jeffrey Mfg. Co.
K.-B. Pulverizer Co.
Kennedy-Van Saun Mfg. & Eng. Corp.
Kent Mill Co.
Lewistown Foundry & Machine Co.
McLanahan-Stone Machine Co.
Pennsylvania Crusher Co.
Raymond Bros. Impact Pulverizer Co.
Stroh Steel Hardening Process Co.
Traylor Eng. & Mfg. Co.
Universal Crusher Co.
Webb City & Carterville F. & M. Works.
Williams Pat. Crusher & Pulverizer Co.
Worthington Pump & Mach. Corp.

DRILLS
Sanderson-Cyclone Drill Co.

DRYERS
American Clay Mach. Co.
Ruggles-Coles Eng. Co.

ENGINEERS
Bacon, Earle C., Inc.
Fuller Engineering Co.
Smidth & Co., F. L.
Schaffer Eng. & Equip. Co.

EXCAVATORS
Ball Engine Co.
Dull, Raymond W., Co.
Good Roads Mach. Co.

FUSES
Ensign-Bickford Co.

GEARS
Caldwell, H. W., & Son Co.

GRAVEL WASHING EQUIPMENT
Good Roads Mach. Co.

GYPSUM-PLASTER
Best Bros. Keene's Cement Co.
Wheeling Wall Plaster Co.

HYDRATING MACHINERY
Kritzer Co., The
Miscampbell, H.
Schaffer Eng. & Equip. Co.

INDUSTRIAL CARS
Watt Mining Car Wheel Co.

LIME, HYDRATED
Scioto Lime & Stone Co.

LABORATORY EQUIPMENT
Bausch & Lomb Optical Co.

LIME KILNS
Steacy-Schmidt Mfg. Co.
Vulcan Iron Works

LOADERS AND UNLOADERS
Haiss Mfg. Co., Inc., Geo.
Jeffrey Mfg. Co.
Gifford-Wood Co.
Stephens-Adamson Mfg. Co.
Weller Mfg. Co.

LOCOMOTIVES
Fate Co., J. D.
Jeffrey Mfg. Co., The

METAL LATH
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Penn Metal Co.

MORTAR COLORS
Chattanooga Paint Co.

MOTORS, ELECTRIC
Gifford-Wood Co.

MOTOR TRUCKS
Federal Motor Truck Co.
Kissel Motor Car Co.
Pierce-Arrow Motor Car Co.
Sterling Motor Truck Co.
White Company, The

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Power Mfg. Co.

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Atlas Powder Co.
Du Pont de Nemours Co., E. I.

PULVERIZED FUEL
Locomotive Pulv. Fuel Co.

SEPARATORS
The W. S. Tyler Co.

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Gifford-Wood Co.
Good Roads Machinery Co.
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TESTING SIEVES AND TESTING SIEVE SHAKERS
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WIRE ROPE
American Steel & Wire Co.
Leschen, A., & Sons Co.

WIRE CLOTH
Audubon Wire Cloth Co.
The W. S. Tyler Co.

ENTERPRISE
NOISELESS MIXERS

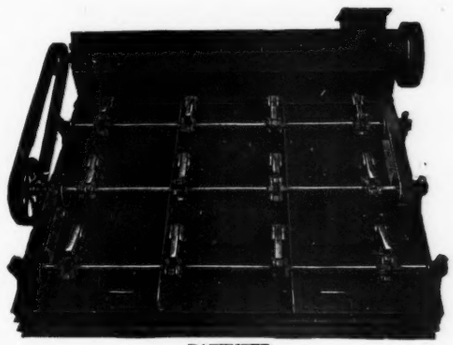
"G-r-r-z-z-z! Blankety-blank-blank!" That's a sound never heard from Enterprise Mixers. They're gearless and noiseless. They devote their energy to mixing instead of to moaning.

But that's only one feature of Enterprise Mixers. We have been engaged in manufacturing them for so many years, that we've found out just what parts are necessary and what aren't necessary to aggregate an efficient machine.

The result of our study is a singularly simple mixer—one that we can guarantee not "temperamental"—but on the job every day and never clogging. No sand, lime or plaster was ever better mixed than that which is mixed in an Enterprise.

Tell us what you want to mix and in what quantities. We'll do the rest!

The J. B. Ehrsam & Sons Mfg. Co.
ENTERPRISE, KANSAS
MANUFACTURERS OF PLASTER MILL MACHINERY, CONVEYING, ELEVATING AND POWER TRANSMISSION



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STURTEVANT
NEWAYGO SCREENS

SCREEN EVERYTHING SCREENABLE FROM ¼ INCH TO 160 MESH

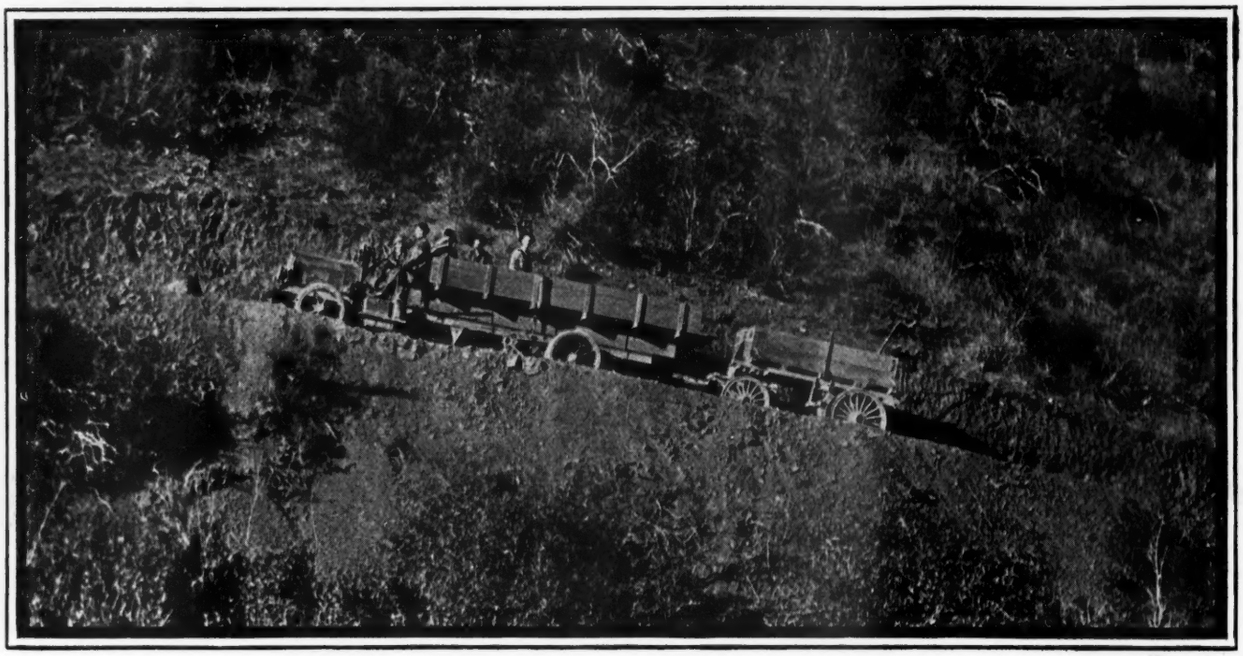
BUILT IN MANY SIZES AND STYLES TO SUIT VARYING REQUIREMENTS — MORE IN USE THAN ALL OTHER INCLINED VIBRATING SCREENS COMBINED.

Screening Principle:—Inclined screen surface so that by an even distribution of feed all of the screen area is in use all of the time. With a screen on a 45° angle a mesh twice as coarse as that of a flat screen gives the same size product. Large openings are difficult to clog and heavy gauge wire is durable. The screen cloth is stretched tight and automatically held taut so that when tapped by hundreds of little hammer blows upon its reenforced surface the wires fairly sing like a piano cord. Such efficient vibration keeps the meshes open and gives large outputs of accurately sized material. One horsepower operates the largest. Send for catalogue.

STURTEVANT MILL COMPANY
BOSTON, MASS.

You will get entire satisfaction if you mention ROCK PRODUCTS.

White Trucks



Hauling Dynamite for Use in Constructing the New Dam

HAULING SUPPLIES FOR NEW $17,000,000 DAM

MACHINERY, tools, materials, supplies and miscellaneous other essentials for the construction of the giant concrete dam built by the Pacific Gas and Electric Company across the Pitt River at Big Bend, California, were transported over the mountains in record time by a fleet of narrow-tread White 5-ton Trucks.

The trucks are owned by Jobe Lukens, a hauling contractor of Red Bluff, California.

The poor condition of the roads, the steep grades and the narrowness of the passes over which the supplies had to be transported, caused other hauling contractors to refuse the contract and gave the promoters grave concern.

Mr. Lukens states that his trucks transported a steady stream of materials daily to the site of the dam and enabled the progress of the construction to proceed without interruption.

The efficient and dependable service rendered by this fleet of White Trucks is characteristic of White performance on great construction and engineering projects everywhere.

THE WHITE COMPANY
CLEVELAND

Largest Manufacturers of Commercial Motor Vehicles in America

The advertiser wants to know that you saw his ad in ROCK PRODUCTS.

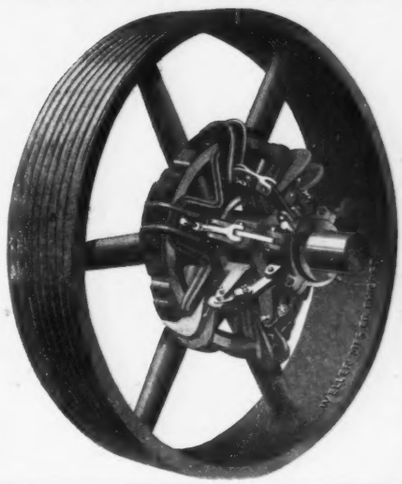
STONE AND GRAVEL ELEVATORS BELT AND PAN CONVEYORS

FURNISHED COMPLETE

We Have What You Need!

That is the knowledge of our patrons—that we can replace at a *moment's* notice, *any part* of their plant. You'll realize this fact if you send for our general catalog.

If you are interested in any specific piece of equipment, let us know. We will send comprehensive literature explaining what we have to offer. Don't delay.



WELLER MFG. CO.

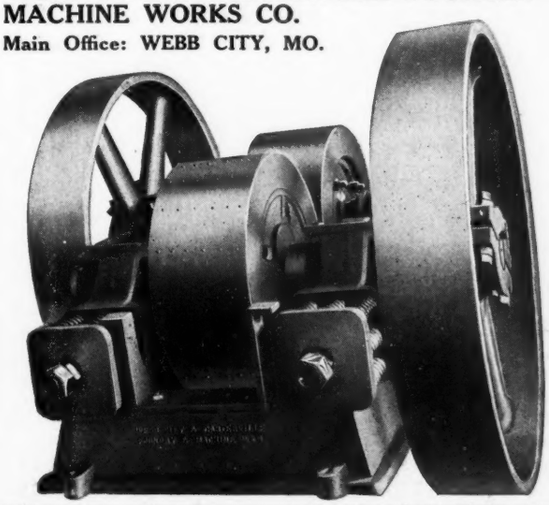
ELEVATING, CONVEYING AND POWER TRANSMITTING MACHINERY

1856 N. Kostner Ave. CHICAGO

WEBB CITY & CARTERVILLE Crushing Rolls

are designed to meet the most advanced practice in wet and dry ore crushing. They have — as our literature proves — all practical points of merit that long continued use has shown to be of value.

WEBB CITY & CARTERVILLE FOUNDRY & MACHINE WORKS CO.
Main Office: WEBB CITY, MO.



Hercules (Red-Strand) Wire Rope

Back of every HERCULES (Red Strand) Wire Rope is a large modern factory, directed by experienced engineering and manufacturing departments, and operated by skilled workmen.

Reg. U. S. Pat. Off.

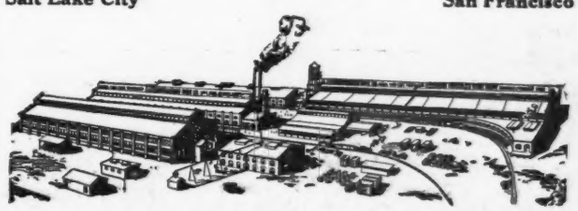
We make a study of Wire Rope working conditions, and are at all times glad to confer with you regarding your problems along this line.

WRITE US

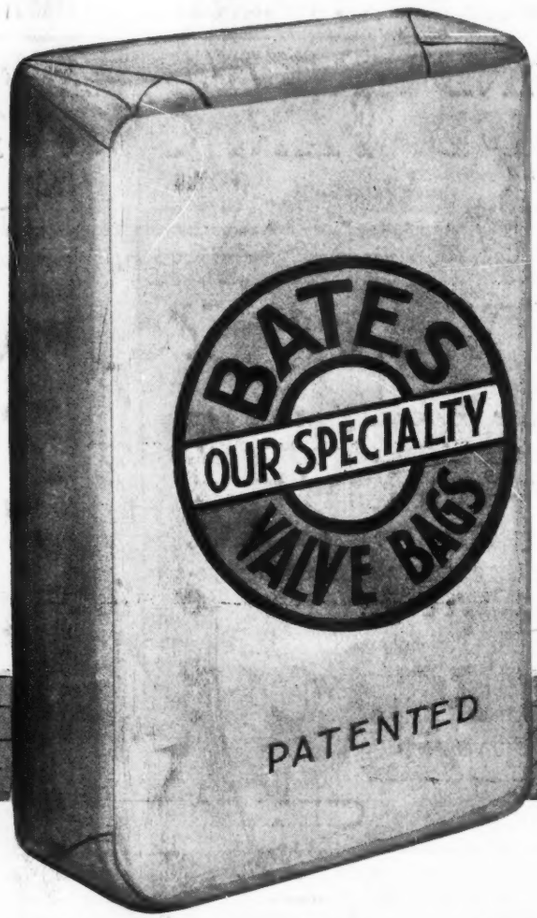
A. Leschen & Sons Rope Co.

St. Louis, U. S. A.

New York Chicago Denver
Salt Lake City San Francisco



For better service say "I saw it in ROCK PRODUCTS."



—easy to stack

BATES BAGS

The Bates Valve Bag is the ideal container for agricultural lime. Neat, Clean, Inexpensive.

BEST QUALITY PAPER BAGS

Because of the uniformity in shape the bags can be piled long and high. Claims for short weight an impossibility.

Ninety per cent of the hydrate manufacturers in the United States and Canada use them. For bagging lime, cement, plaster and similar materials it is without a rival.

URSCHEL BATES VALVE BAG CO.

TOLEDO, OHIO.